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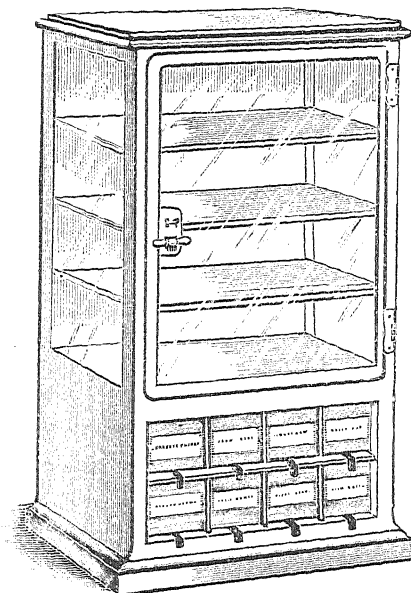
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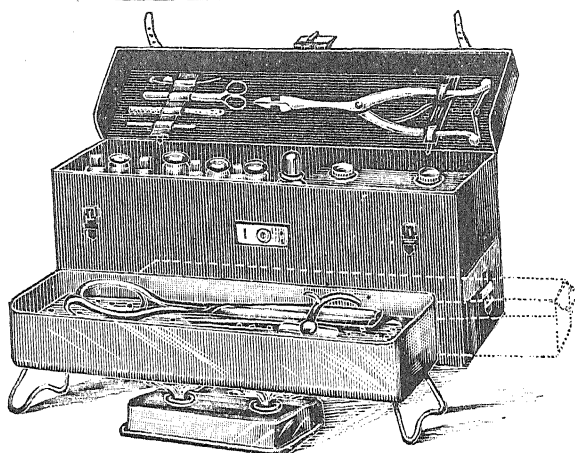
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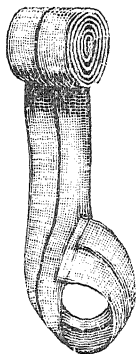
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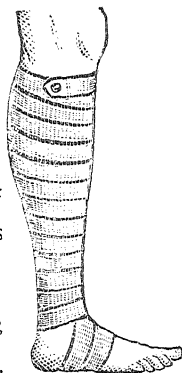


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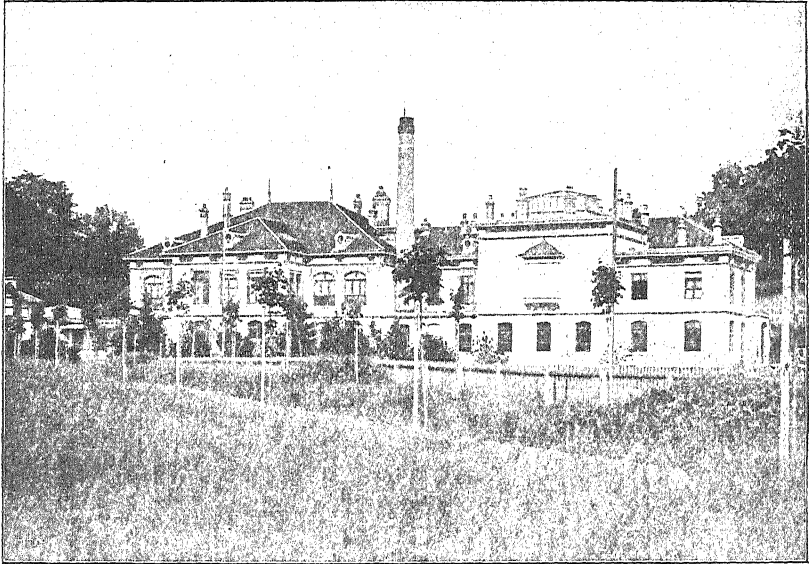
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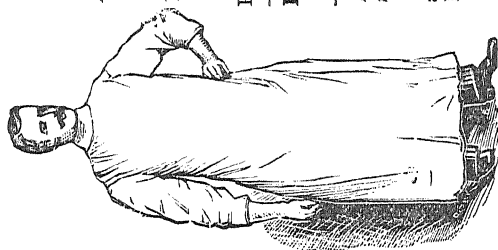


Fig. 1.

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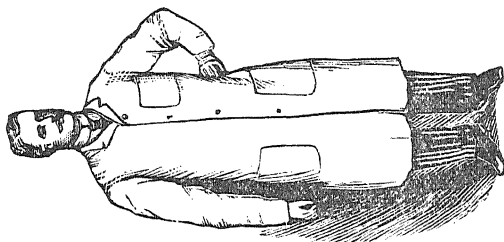


Fig. 2.

**MUSLINETTE
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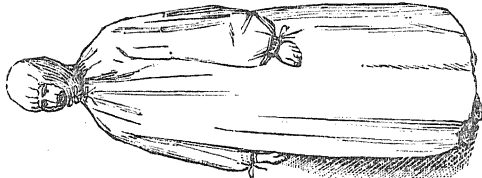


Fig. 3.

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Fig. 2.

Fig. 3.

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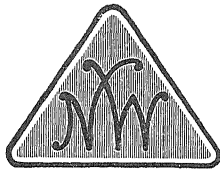
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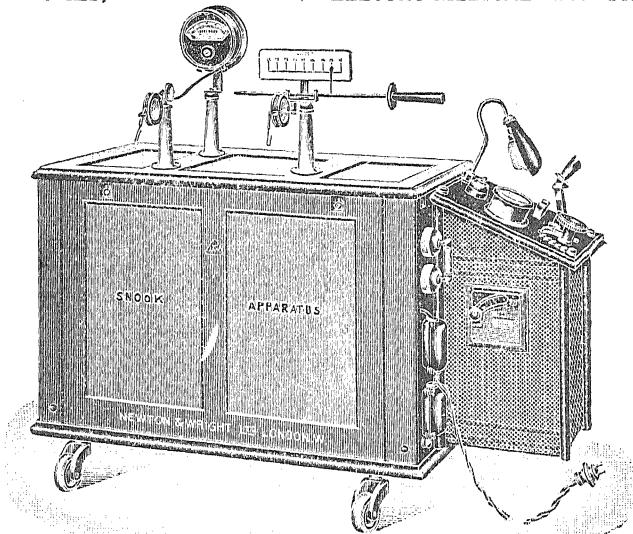
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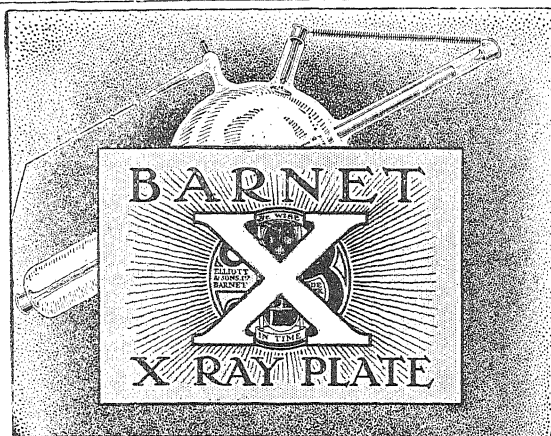
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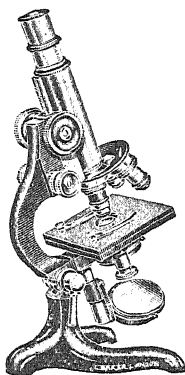
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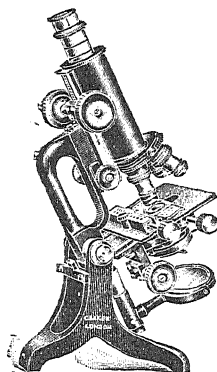
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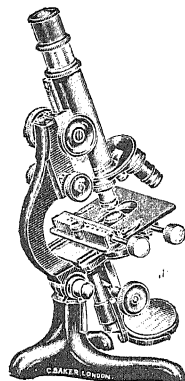
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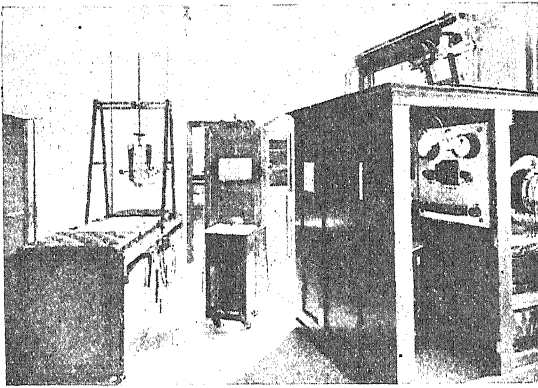
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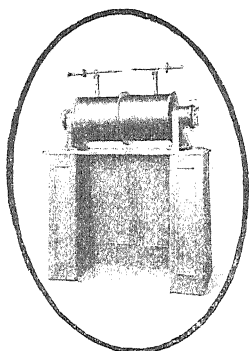
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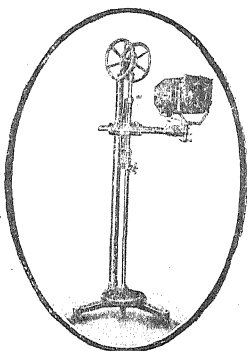
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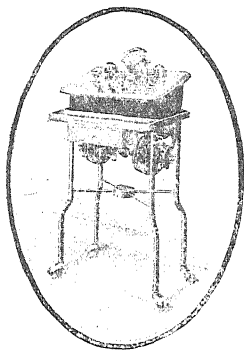
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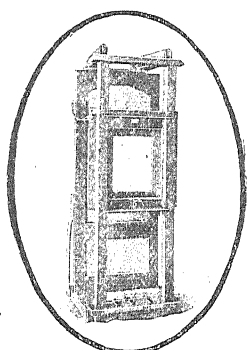


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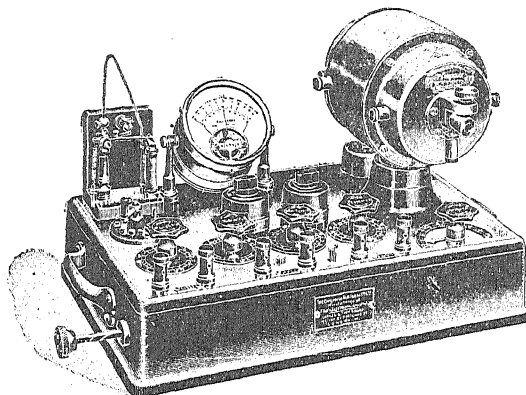


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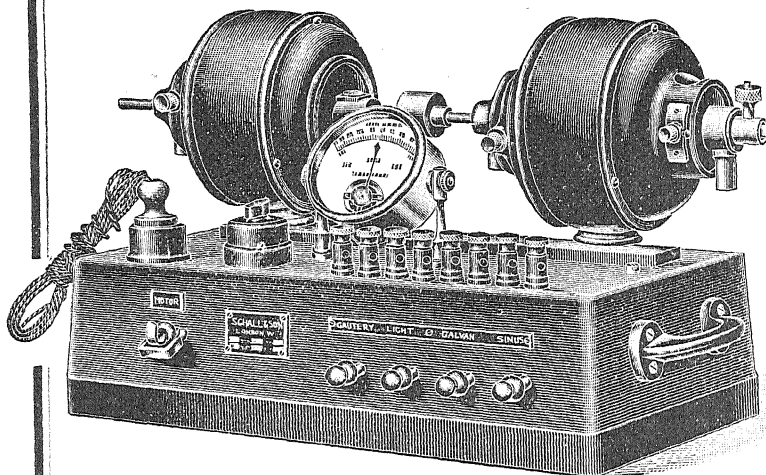
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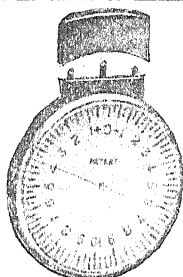
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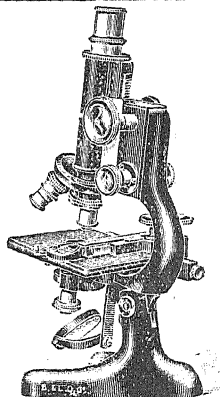
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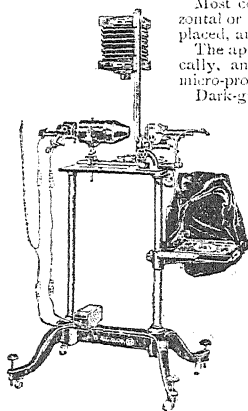
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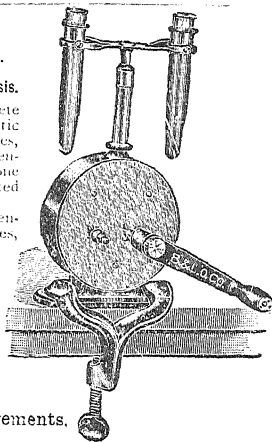
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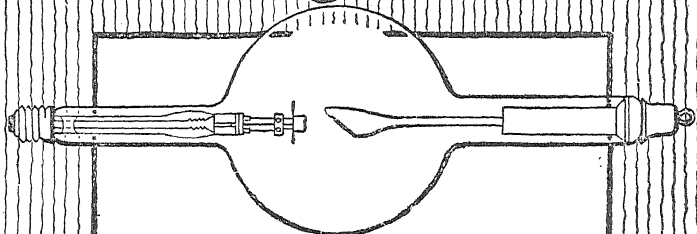
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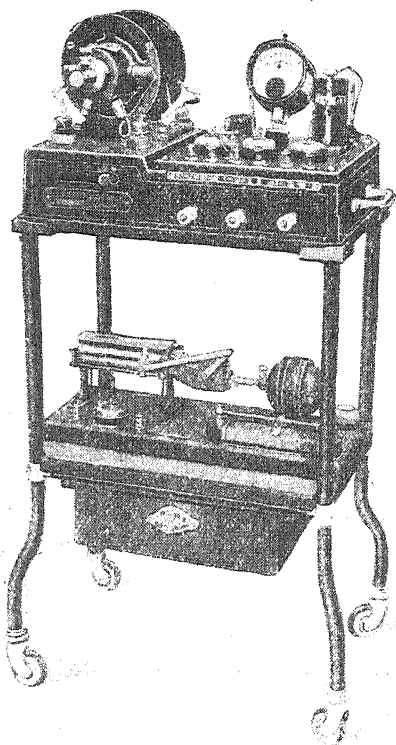
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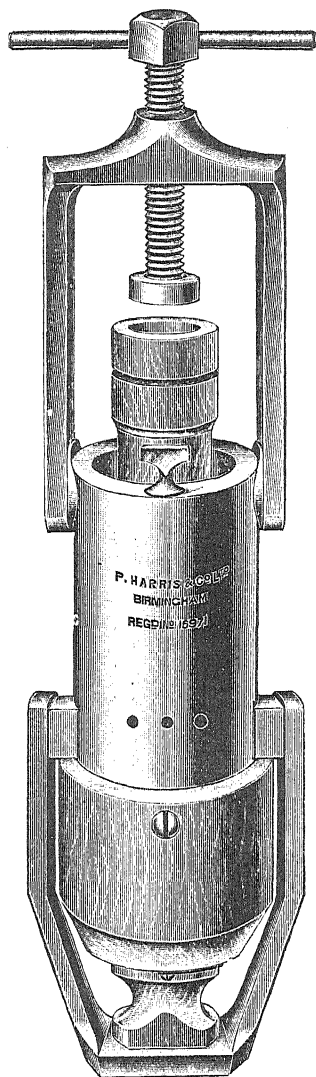


Fig. 7.

The "Hall-Edwards" Carbon Dioxide Snow Collector and Compressor.

Apparatus for Collecting and Applying Carbon Dioxide Snow.

SEE THE LITTLE MANUAL:—

CARBON DIOXIDE SNOW: Its Therapeutic Uses. By J. HALL-EDWARDS, L.R.C.P., F.R.S. (Edin.), Hon. F.R.S. London: Simpkin, Marshall, Hamilton, Kent & Co., Ltd. 1913. Crown 8vo, pp. 23. 3s. 6d. net.

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The snow is always of the same hardness and the test of complete and proper compression is that the cone should sink in water.

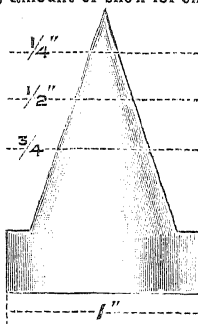


Fig. 9.

Fig. 9.—Diagram of Compressed Snow, showing broad base and cone-shaped projection. The transverse lines indicate the positions for cutting off the cone so as to produce a circle of any desired diameter.

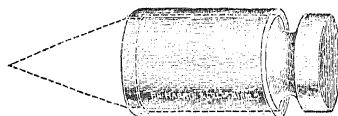


Fig. 10.

Fig. 10.—The applicator showing cone of compressed snow projecting from its lower end.

SET No. I.—

Hall-Edwards' Improved Set for producing CO₂ Hard Snow, comprising:—Collector, fitted with top and bottom stirrup compressor (see Fig. 7), Special Hammer and Metal Rods, also used for producing compressed small pencils of hard snow, Hardwood Applicator for holding cone of snow (see Fig. 10), Special Nipple and Union for attaching to Cylinder. The above apparatus is made of Lignum-Vitæ and Delta Metal, nickel plated complete £3 5 0

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"Electrargol . . . absolutely innocuous."—LANCET, Vol. I., pp. 89, 684; 1912.
"Small-pox treated with Electrargol."—B.M.J., Vol. II, p. 606; 1913. Vol. I., p. 1236; 1914.
"In Measles."—LANCET, Vol. I., 40; 1914. "In Plague."—B.M.J., Vol. I., p. 1236; 1914.
"Colloidal Silver of real service in erysipelas."—MEDICAL PRESS, Vol. I., p. 377; 1914.

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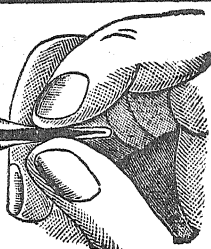
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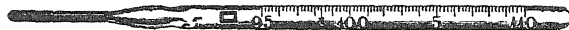
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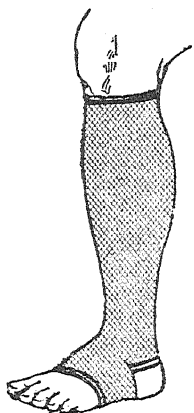
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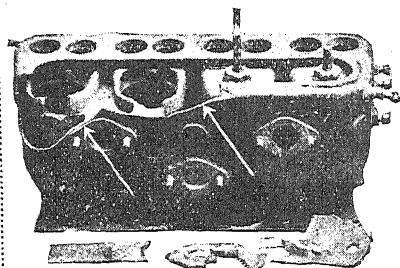
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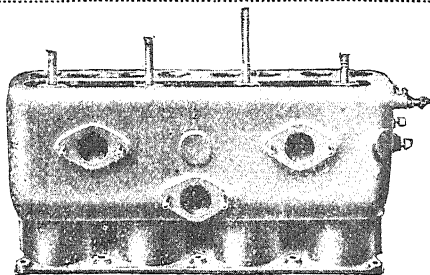
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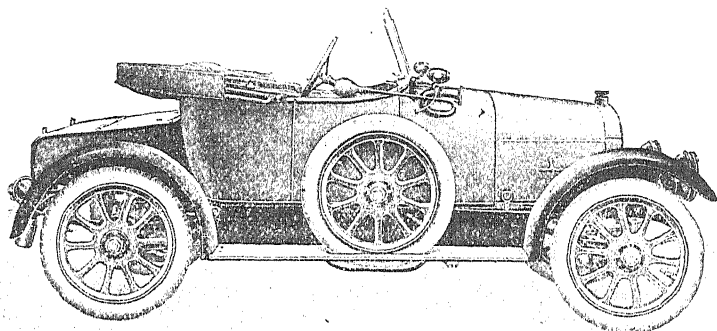
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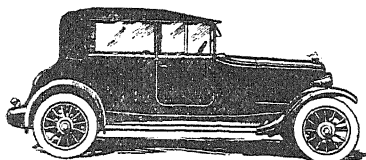
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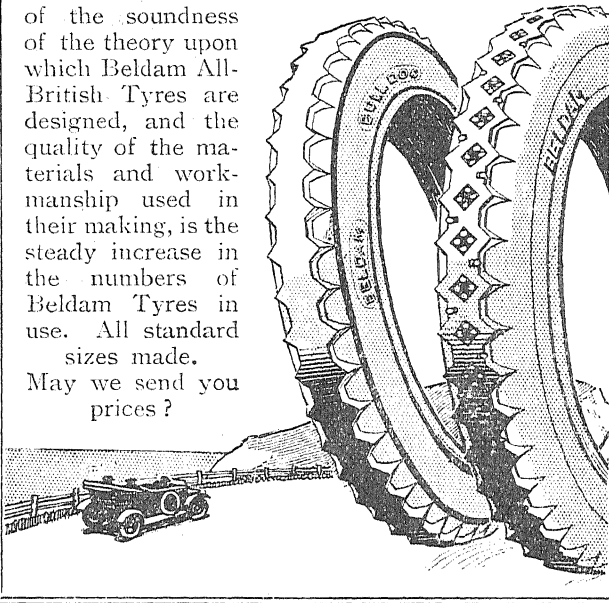
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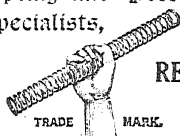
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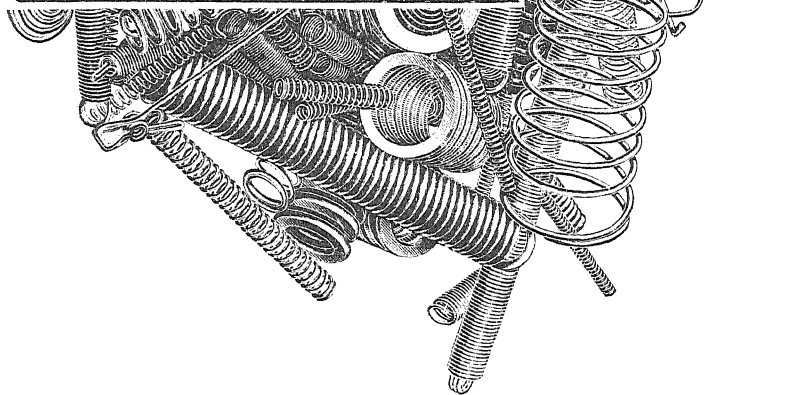
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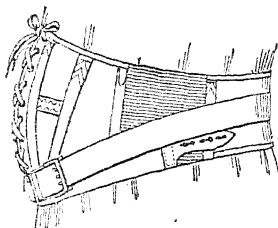
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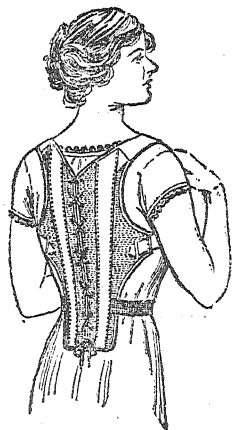
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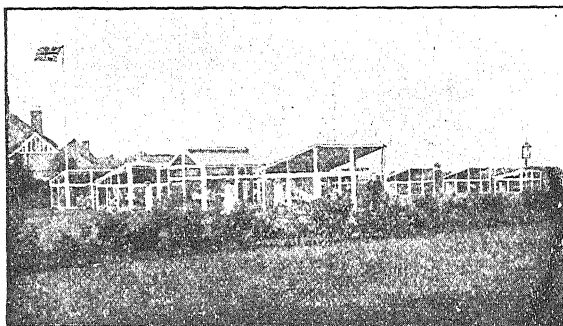
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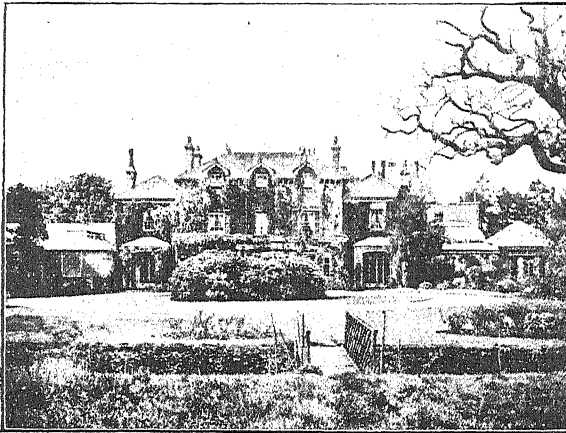
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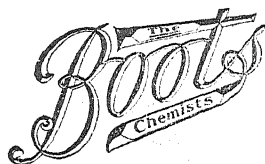
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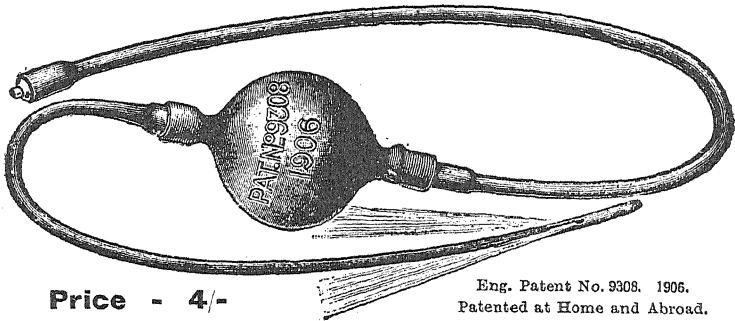
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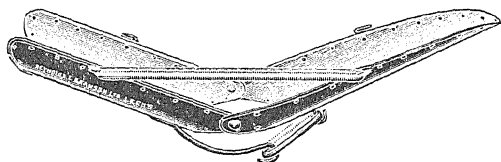
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DATE	DAY OF MONTH																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
21	TEMPERATURE																				
22	PULSE																				
23	RESPIRATION																				
24	RESULT																				

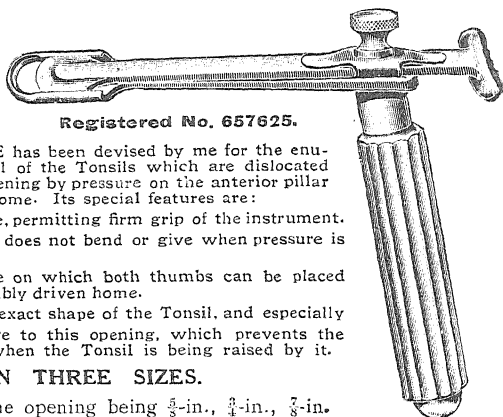
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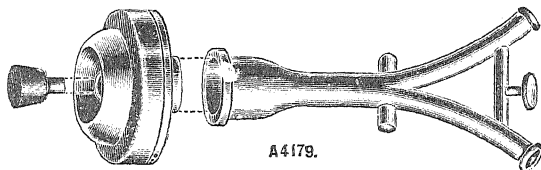
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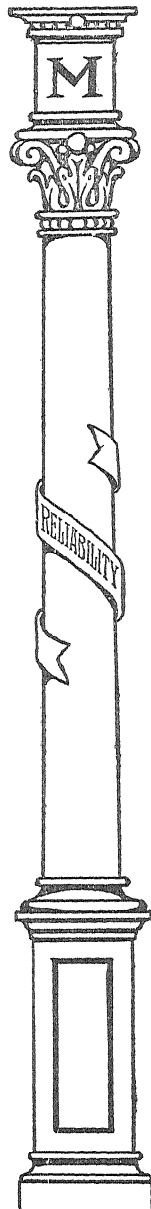
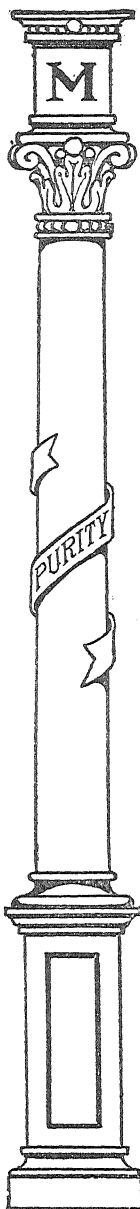
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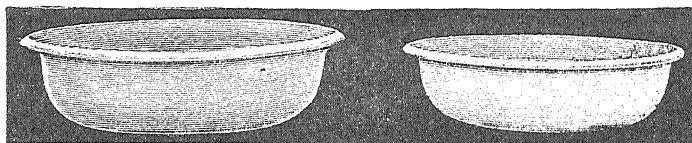
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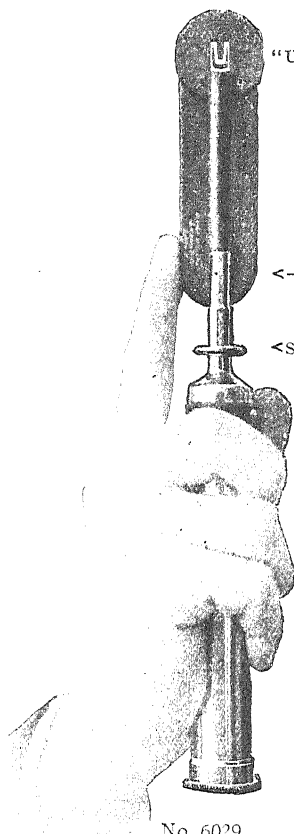
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PELMANISM AND THE PROFESSIONS.

A GREAT deal of the strongest and most convincing evidence of the value of Pelmanism comes from members of the professional classes. There is no single profession unrepresented among the witnesses. Medical men, judges, barristers, solicitors, clergymen of all ranks and of all denominations, soldiers and sailors, architects, musicians, engineers, accountants, and authors are all to be found amongst the most enthusiastic advocates of Pelmanism, all of them adding their voices to the general chorus of praise.

Such praise is not to be passed over lightly. The man whose education has taken him into one of the professions is, *prima facie*, a competent judge of an educational question. He is equipped with the knowledge which enables him to examine critically principles as well as results. He is not in the least likely to humbug himself into a belief that his memory has been improved when it has not, or that his powers of observation have increased when they have remained stationary. Neither is he likely to deceive himself in such personal matters as to whether his self-confidence and his will power have been strengthened or the reverse. Self-deception in such matters would be practically impossible, and there is no reason in the world for deceiving others on such purely individual questions.

When, therefore, after personally undergoing a training in Pelmanism he pays his tribute not only to the results but to the basic principles and skilfully devised methods which have produced such results, very special weight must be attached to his evidence. There might, for instance, to anyone unacquainted with the principles and practice of Pelmanism, be room for error in the statement of the young clerk who attributes the doubling of his salary directly to his devotion to the "little grey books," but there can be none in the verdict of the professional man who traces his professional advancement to renewed and more ordered mental activity due to his training in Pelmanism. Of such professional evidence there is an almost unimaginable volume from which it is difficult to select, touching as it does life from such a variety of aspects.

THE CLEAN MIND.

A very great deal of that evidence is supplied by Army students, which is but natural in view of the fact that the Army has taken up Pelmanism with unexampled enthusiasm. Generals have studied it themselves, and recommended it to their staffs. In pack and pocket the "little grey books" have been carried all over the world, and this is not surprising, since the man in the Army had the best of all reasons for knowing that efficiency must be added to the "will to win" for the achievement of victory. That Pelmanism supplies the training for producing efficiency the whole of the evidence available from Army sources makes clear. One might fill *The Medical Annual* with such evidence, but it must suffice to quote from the letter of one officer of field-rank to illustrate the general effect of the training:

I can give no higher appreciation of the Pelman Course than to say it accomplishes exactly what it professes it will do.

In the space of little over three months my improvement in memory, perception, self-confidence, and self-control is such that I should never have thought it possible.

The practice of seeing things as they really are by means of analysis has solved for me one important problem in life. . . . Lists of details, including numbers, dates, weights etc., etc., of any length can be fixed accurately in the memory. By this means I have everything in the Field Service Pocket Book (a mass of detail) at my fingers' ends. . . . Altogether it has made me feel cleaner in mind and body. Anyone who has once acquired the Pelman habit will acknowledge as I do : you cannot go back on yourself. I have found that the training has made me sincere with myself, and that I have the desire to accomplish with thoroughness anything I set my hand to.

THE PELMAN HABIT.

There are one or two phrases in this letter which particularly strike the attention. The first is the statement that the Pelman course of training accomplishes exactly what it professes to do. What the claim is will be found in the introductory remarks to the very first lesson sent to the student. There the system is described as "a full course of instruction in mental efficiency, designed to meet every requirement of thought and life." The letter quoted above reveals how the claim is made good. In big things and in the little things it plays its part, consistently and continually, through the setting up of the "Pelman habit," which makes for conscious sincerity and thoroughness alike in work and in play.

A RAPID CONVERSION.

No matter how sceptical anyone may be as to the possibilities of Pelmanism, such scepticism will not survive actual experience. A very striking example of this conversion of the sceptic is found in the correspondence of a solicitor during the taking of the course. Not being satisfied with the general guarantee given that fees will be returned to students who can conscientiously declare after passing through the training that they have received no benefit, he asked for and obtained a personal guarantee to the same effect.

He needed to go no further than the second lesson before discovering that his scepticism was baseless, for he then wrote :—

I am more impressed than I can say by the extraordinary depth and insight revealed by the two lessons which I have studied so far. If the others are as scientifically accurate and well founded on the principles of psychology, I shall consider that my introduction to Pelman has been the greatest fact of my life.

As he proceeded with the course this opinion only deepened. After the fourth lesson he wrote that already the course had proved an "inestimable benefit," and after the sixth lesson that he would "regard it cheap at £100," and that he wished he had only known of it ten years previously. Then a little later he says :—

The further I go with the system the more I am astounded with the revelations. I used to think the claims made for it *must* be fantastic ; now I consider them to be understatements of the truth.

Practically that is the experience of everybody who has put Pelmanism to the personal test, whether starting as a believer, a half-believer, or a complete sceptic.

PROMISE AND PERFORMANCE.

Here we have again the promise of Pelmanism fulfilled in a measure beyond all expectations, and it is noteworthy that these expressions of astonishment at the amazing results occur most frequently in the correspondence of men who have been educated for the professions. It is echoed for instance in the following words of an accountant :—

Before taking up the Pelman course I always held that a reliable memory and an alert and controlled mind were matters of 'luck,' possessed only by those fortunate enough to be born with them. My opinion has entirely changed, and I am convinced that anyone of average (or even less) mental ability can, by taking the Pelman course train his or her mind into a state of efficiency beyond all expectation. I now find myself on a business level with others with whom I had never even hoped to compete.

The accountant's experience may be matched by that of the clergyman, who writes :—

Last Sunday I preached twice and lectured in the afternoon with only a few notes. You have given me a method, and have enabled me to pass a renewed vote of confidence in a memory I have often described as "the thing I forget with."

THE PELMAN TONIC.

The defective memory is, of course, only one of the many mental deficiencies which Pelmanism remedies, for it is an all-round energiser, awakening latent powers, and bracing up flagging faculties. As a London doctor puts it, "The Pelman Course would stimulate anyone, and has acted as a mental tonic to me, although I am an expert psychologist."

This is an instance of the wise physician seeking another expert for treatment, and as an expert himself his testimony is doubly valuable. He is by no means the only professional man, however, who experiences precisely the same effect from a course of Pelmanism. A solicitor who found it "particularly useful" in assisting him to "deal with professional work and problems far more efficiently" than heretofore, has "no hesitation whatever in recommending the Pelman Course as a tonic to the mind."

A SPLENDID INVESTMENT.

The effects of this tonic treatment are well described in the letter of another medical man, who writes :—

I took the Pelman Course because my practice was not in a satisfactory condition and I could not discover the cause. Your lessons enabled me to analyze the facts, discover the weak points and correct them, with most satisfactory results. It has proved a splendid investment for me.

Investment is indeed exactly the right word with which to describe the small payment asked for a training in Pelmanism. It is an investment which pays a steady and assured dividend, while the capital shows an equally steady appreciation. There is no finality about

Pelmanism. The man who has been taught to exercise his mental faculties properly has gained something definite, of which he cannot rid himself if he would. Not that he is likely to desire to do so. The power of quick and accurate observation, the ability to concentrate the attention, to reason logically, and to draw correct deductions from the stored impressions at the instant command of a retentive memory, are not advantages of which any man would willingly be dispossessed, least of all the professional man to whom brain power spells success or failure. And these are precisely the qualities which a course of Pelmanism develops, together with the qualities of enterprise, self-confidence, and will-power, equally necessary for complete self-realization. Again let a professional man speak :—

My memory has been greatly improved. The failing for which I took the course, solely and wholly to correct my lack of confidence, is being eradicated, and I realize myself. In my daily duties, which are very varied, I am still proving the value of it in observation and grasp of detail. It is the finest investment I have yet made.

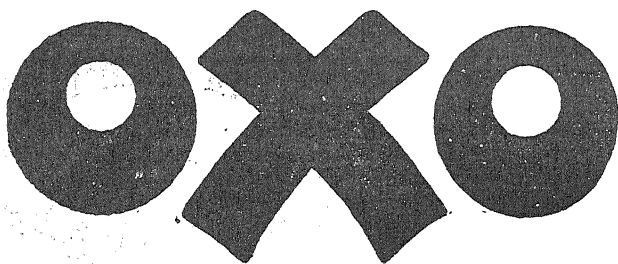
There is no vagueness about any of these benefits. They are just plain, simple statements of progress towards a higher mental efficiency which occur continually in the correspondence of those who have passed through the Pelman Course. They occur any day and every day, and it is the invariability of their occurrence which creates such an impression upon all those who have taken the trouble to investigate the claims of Pelmanism.

SOME NOTABLE INVESTIGATORS.

Amongst those who have bestowed such time and trouble may be numbered many men whose judgment carries weight. Lord Charles Beresford speaks for the Navy; Major-General Sir F. Maurice for the Army; Sir Theodore Cook and Sir Harry Johnston, Sir Arthur Quiller-Couch, Sir William Robertson Nicoll, Sir James Yoxall, Sir H. Rider Haggard, Mr. George R. Sims, and Mr. Max Pemberton, among others, for civilian life. They are a body of men of widely differing opinions. They see life from widely different angles, but they one and all, after personal investigation, have found Pelmanism to be good both in principle and practice.

Many of these gentlemen commenced their investigations in a distinctly sceptical spirit, as they have themselves explained. But they discovered, as any fair-minded man must needs discover on making an impartial investigation of the evidence, that it is impossible not to acknowledge the value of Pelmanism. There is no room for an adverse verdict. The professional man can no more go through the course "without getting something good, right out of all proportion to its cost," as one Pelmanist puts it, than the man or woman in any other walk of life. Pelmanism is of universal application, and the greater the latent capabilities the greater is its value.

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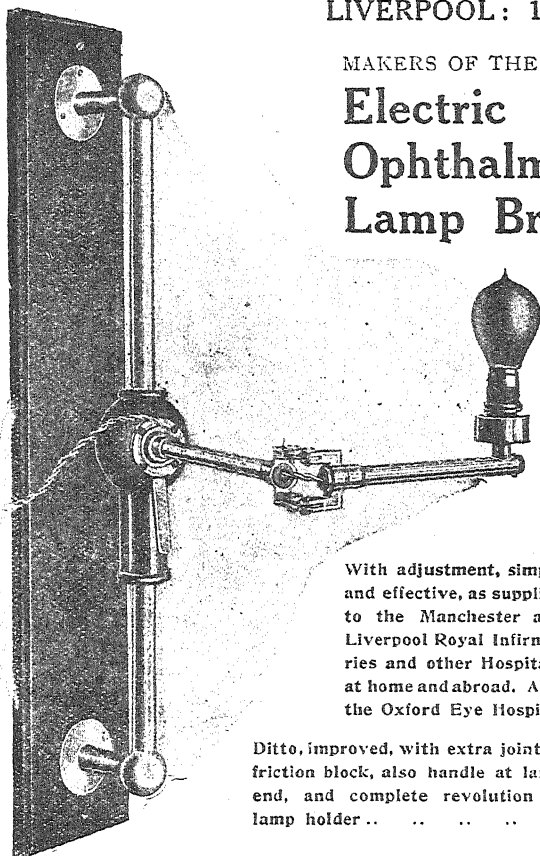
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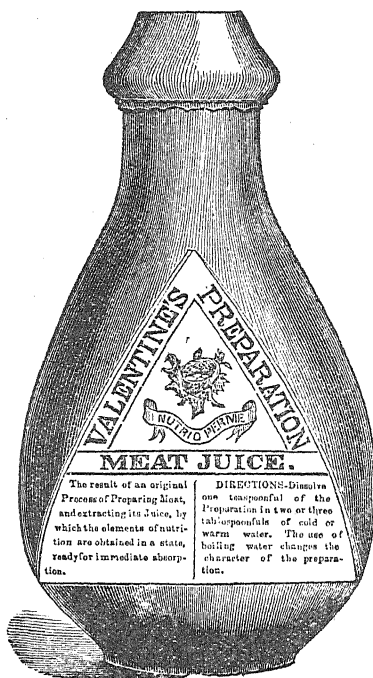
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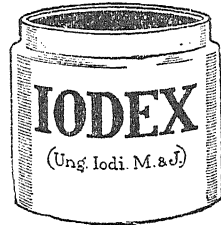
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Introduction.

A REVIEW OF THE YEAR'S WORK.

BY THE EDITOR.

THE present volume has been prepared during the last days of the great War, and under the oppressive conditions of its aftermath. At no time have the difficulties been so great, not only as regards the question of labour and increased cost of production, but also the finish of fighting has not greatly diminished the strain on our editorial staff. For while the War is over, the task of clearing up the wreckage remains. The labour is one of great magnitude, because of the high conception of duty towards those who have suffered physical infirmity. No longer is the work of the surgeon considered complete when the wound has healed or the bone is set. His work must be continued until the functions of the wounded limbs are restored. We call this secondary treatment orthopædic surgery, but it is a little difficult to define where general surgery ends and the work of the orthopædic surgeon commences. Sir Robert Jones tells us that "the term practically covers the whole of the surgery of the extremities, and therefore a very large percentage of war injuries . . . that the aim of the orthopædic surgeon is to restore the functional use of disabled limbs."

In order to render this work efficient, it is necessary that the surgeon should adopt measures in uniting fractures which obviate future difficulties. Some valuable hints are given on this subject in Mr. Hey Groves's and Mr. C. A. Joll's article on *Orthopædic Surgery*, while a number of new methods and splints for use in the treatment of fractures will be found in the article *Orthopædic Appliances*.

We think there is a natural division between surgery proper and orthopædics, arising from the fact that a period must elapse after the healing of a wound or the setting of a fracture before efforts to restore function may be undertaken. Sir Robert Jones emphasizes the importance of this, especially as regards forcible manipulative treatment of injuries to joints, as they occur in war surgery, as in these cases severe

sepsis may be lighted up and material injury done. It is in this after- or secondary treatment that the skill of the orthopædist is necessary. It was owing to the fear of danger from forcible manipulation to restore a joint stiffened after injury that numbers of cases with only slight adhesions were allowed to continue with stiff joints; and it was here that the bone-setter made his reputation. Under the present system such cases are less likely to occur, because scientific exercises form an essential part of orthopædic treatment, and afford much better results than do forcible manipulations. The remarkable rapidity with which large and well-equipped hospitals have been founded to deal with these cases is creditable to all concerned. Mr. C. Thurstan Holland (*Radio-activity and Electrotherapeutics*) describes and illustrates one of these hospitals, and gives particulars of the method of organization.

But in spite of all the valuable work which is being done, and because of the interval which must elapse before many of these cases can be treated, large numbers will drift into civil life and come under the care of the general practitioner. It would be unfortunate if the impression were created that the resources of a well-equipped hospital were necessary to restore muscular function or locomotion.

While massage and electricity can aid the *nutrition* of muscles and nerves, they cannot restore the power of locomotion or the *functional use of limbs*. To restore any group of muscles, we must stimulate the centres in the brain and spinal cord which control the action of the muscle. This can only be accomplished by the concentrated energy of the patient while all other muscular groups are at rest. We direct him to perform the movement, and either assist or resist it according to his powers. Any intelligent person can be taught to do this. Such movements should be prescribed by *number*, not by time. Eight to twelve movements with a pause between each is sufficient at one time. The movement must be slow and complete, i.e., flexion and extension must be carried to the fullest possible extent. Beyond all, it is necessary to see that all the remaining muscles are at rest. This simple method will produce a daily improvement, and merely requires the direction of the medical adviser.

But while the value of systematic exercises has been pointed out, not only for improvement of limbs but for the treatment of war neuroses and soldier's heart, there is a danger lest the enthusiastic efforts of the patient or operator cause more harm than good, because it is as easy to exhaust the nerve centres by over-stimulation as to restore them by

judicious efforts. Dr. Ramsay Hunt (*Paralysis*) describes a pseudo-paralysis developed by apparently healthy men under intensive military training. All the cases were characterized by certain somatic symptoms strongly suggestive of early paresis, namely the pupillary changes, the tremors, and disturbances of articulation. He points out that fatigue is associated with the production of certain toxins which act upon the central nervous system as well as on the muscle tissue.

While formerly the manufacturer of artificial limbs had to adapt the appliance to the stump left after amputation, at the present moment the whole methods of amputation are dominated by the requirements of the artificial limb. Out of this has grown a new method, called the 'kineplastic stump,' which is not intended for weight-bearing, but to constitute an integral part of the appliance which is to be used subsequent to the operation. This is fully described and illustrated in the article *Amputations*.

One of the most interesting problems in War Surgery is the restoration of injured nerves, by which the functions of the muscles are recovered. The article *Nerves, Peripheral, Surgery of*, by Mr. Hey Groves and Mr. C. A. Joll, will be read with great interest; also the article *Bone and Cartilage Grafting* by the same authors. Both are fully illustrated.

Fractures, and *Femur, Gunshot Fractures of*, form the subject of special articles, and should be read in conjunction with the papers on orthopaedic surgery and appliances.

We are also able to produce another article by Mr. Dolamore on *Jaws and Face, Gunshot Injuries of*. The results produced in this branch of surgery are remarkable, and give evidence of great trouble and skill in overcoming the natural difficulties.

A valuable article on *Surgical Shock* is contributed by Mr. Rendle Short, and the somewhat conflicting views as to its pathology are fully discussed. There is a general agreement that warmth and rest are the first indications, and that *Blood Transfusion* (see special article) is the most valuable remedy. In some cases a 6 per cent gum-acacia solution in normal saline has been used for transfusion. Carbon dioxide has also been employed to stimulate respiration.

In abdominal operations, whether the drainage should be anterior or posterior is still a vexed question with surgeons. In Dr. Wyllys Andrews's article, *Abdomen*, illustrations are given of the combined prone and Fowler's positions.

Many articles have appeared during the year urging cholecystectomy as more radical and curative than drainage of the gall-bladder (*Bile Tract and Liver*).

Some new methods of operating in cases of *Hernia* have been proposed. Mr. Sampson Handley recommends a "darning or stay-lace process." Lieut.-Col. Hull emphasizes the importance of choosing that operation which best answers the purpose in the shortest possible time. He describes a simple method under local anæsthesia.

Dr. Maurice Nicoll, in *Neuroses of War*, tells us that both in civil life and in war a neurosis is the expression of a failure of adaptation. In war neuroses we have to distinguish between cases due to fatigue and those due to concussion. In the early stages rest and quiet are essential conditions. As regards the use of sedatives, a useful hint is given in respect to morphia: "It is not advisable when the phantasy of life is predominant . . . but after the phantasy level is abolished (as by chloroform) it is useful."

Anæsthesia by the injection of ether into the rectum has been the subject of much attention, and the proper *modus operandi* is fully considered in the article on *Anæsthetics*. It appears to be especially favoured in gastric surgery and in operations upon the head and neck.

Ether has also been given by the mouth to afford temporary relief to pain while painful dressings are being accomplished. For the brief anæsthesia required during orthopædic operations, nitrous oxide is most favoured. Formerly chloroform was supposed to be better, as giving more complete relaxation, but this in practice is not of great account.

An interesting point in the use of local anæsthetics is that alkalies increase their efficiency from two to four times. One-half per cent of sodium bicarbonate is added to the cocaine or other anæsthetic.

Percussion over the seventh cervical vertebra is said to have produced good results in aortic *Aneurysm*.

The causation of pain in *Angina Pectoris* is a vexed question, and cannot be regarded as entirely solved. Some important views on this point will be found in the article. Rest and digitalis have been found the main remedies for *Auricular Fibrillation*. Bishop claims that the action of digitalis is enhanced by giving ipecacuanha with it. He uses a tablet of pulv. digit. gr. $\frac{1}{2}$, ipecac. gr. $\frac{1}{8}$.

Zangger claims that in cases of senile cardiosclerosis much benefit is obtained from tincture of camphor in doses of 10 to 15 drops on sugar (*Heart Disease*).

Poynton cautions against the bad effects of salicyl compounds upon the hearts of fragile and delicate children (*Rheumatic Heart Disease*).

It is very important to distinguish between cases of true cardiac *Tachycardia* and nervous tachycardia. Dr. Carey Coombs gives some very helpful information on the point. *Digitalis* is the main remedy, but in some cardiac cases we have seen good results from liq. extract *apocynum* 5 min.

Soldier's Heart has become one of the difficult medical problems both during the war and after. Dr. Carey Coombs deals very fully with the points which have to be settled in these cases. Much stress is put upon the effects of optimistic suggestion. Work carried out under adequate observation is not only the means of testing efficiency, but also the sole plan of cure. Heart tonics are regarded as of little value.

The recent literature of *Cerebrospinal Fever* is fully considered by Dr. Rolleston. It is regarded as not primarily a meningitis but a generalized systemic invasion. One of the earliest signs in 75 per cent of cases is a petechial rash which appears on the deltoid region, hips, trunk, face, etc. Large doses of the special serum must be given in the earliest stage.

An early test for *Measles* is to apply a dry cupping-glass to the skin: a reddish circle appears, being wider and deeper in colour if the rash is about to appear. Another early test is to look for signs of inflammation at the external canthus of the eye in the plica semilunaris. This disappears when the eruption appears.

Owing to the "many resemblances which scarlet fever has to acute rheumatism," Ramond and Schultz advocate treatment by large doses of salicylates, i.e., "an average dose of 90 gr. a day." We do not endorse this suggestion (*Scarlet Fever*).

Dr. E. W. Goodall describes some of the unpleasant results of anti-toxic treatment for diphtheria. A rash appeared in 40 per cent of cases, arthritis in 4.3 per cent of cases; albuminuria and vomiting are not uncommon (*Serum Sickness*).

Vaccination by the intradermal method has been used with good results in India; it appears to be more efficient than scarification, and the superficial vesiculation is avoided.

A plea has been put forward for the recognition of the common origin of chicken-pox and shingles. We think there is a good deal to be said against this view (*Varicella*).

Methylene blue has been used in *Typhoid Fever* with benefit in a certain number of cases.

For *Typhus Fever* the transfusion of blood obtained from convalescent patients has been used with good results.

The article on *Influenza*, by Dr. Rolleston, will be read with interest. Despite exhaustive enquiry the exact rôle of the Pfeiffer bacillus is as yet not fully determined. Large doses of salicin have been recommended by E. B. Turner, and good results also appear to have followed the use of calomel and acetylsalicylic acid. In pneumonic cases large doses of digitalis are employed.

Dr. E. W. Goodall gives a very full description of *Trench Fever*, which will be read with interest. There appears to be no specific treatment, but rest in bed is an important indication.

An epidemic which appeared during the early months of last year was attributed to botulism, and thought to be due to the use of tinned meats. Further investigation proved that this view was not correct. A full account of the symptoms and pathology is given in an article by Dr. S. A. Kinnier Wilson (*Encephalitis, Epidemic*), but our knowledge of the best treatment is not very advanced at present.

In an instructive article by Dr. C. S. Bacon on the vomiting of pregnancy, it is mentioned that alcohol is very valuable, as being more readily utilized than other energy foods; it is more easily absorbed than glucose, which he recommends in preference to the carbohydrates, and it helps to check fermentation in the colon. He cautions against its being given too strong and in too large a quantity (*Pregnancy, Vomiting of*).

Dr. Bedford Pierce, in his article *Drug Addiction and Inebriety*, tells us that the active campaign against alcohol in the United States has led to an increase in drug addiction.

In Dr. Latham's article on *Pneumonia*, mention is made of Edwin Matthew's treatment of pneumonia with quinine urea hydrochloride by intramuscular injection. Fifteen grains were given every three hours.

and the results were satisfactory. We think the dose would have to be well diluted to avoid any local effect upon the circulation.

The local application of the black oxide or sulphate of copper is claimed to have a specific effect upon streptococcic skin disease. A solution of 1-1000 is used at onset. Also intravenous injections of copper ammonium sulphate, 4 per cent aqueous solution, have been used with good results (*Copper Sulphate*, Dictionary of Remedies).

Among the remedies mentioned for *Acne*, x-ray treatment has an important place, but involves some risk unless administered with caution.

The 'open method' of treating *Burns* is described and recommended especially in cases where all the dead tissue has sloughed away and a raw, granulating surface is left.

In a very chronic case of *Eczema*, thyroid extract in $\frac{1}{2}$ -gr. doses thrice daily gave decided results. •

Marfan declares in favour of the tuberculous causation of *Erythema Nodosum*, but we have seen many cases where no such connection existed.

A simple way to treat those troublesome cracks which occur on the fingers is that they should be filled with shoemaker's wax (*Finger Cracks*).

Fluid extract of ergot has been suggested as a remedy for the pain of *Herpes Zoster*.

Good results appear to have been obtained in *Hyperidrosis* by the use of a 25 per cent solution of aluminium chloride.

It is claimed that in *Pediculosis Pubis* the part need only be bathed in petrol or gasolene, without shaving the part and applying mercury.

Dr. Graham Little's articles on *Pruritus* and *Psoriasis* both contain a number of useful formulæ and methods of treatment of a helpful character.

Dr. Priestley regards *Ringworm* as of low infectivity, and would allow children to attend school if certain precautions are taken.

In the treatment of *Scabies* the vapour sulphur bath is condemned. The free use of soap, followed by sulphur ointment, is the basis of most efficient treatments.

Further investigations of seborrhœa show that it is connected with a general acidosis and that the urine is hyperacid. Alkalies pushed to

the point of causing alkaline urine are recommended, and also the local application of alkalis (*Seborrhæic Eruptions*).

A novel method of treating boils by electrolysis has been suggested. First the negative needle is introduced until bubbles of hydrogen appear, and then after three minutes the positive needle is used, which causes oxygen and ozone to be set free to disinfect the lesion. A strength of 10 ma. is recommended, and the result would be a very painful séance (*Skin, Staphylococcic Infections of*).

H. T. Patrick states that only one in ten of the cases of brachial neuritis referred to him proved to be true examples of the affection. By far the larger number were cases of arthritis of the shoulder-joint (*Neuritis and Neuralgia*). We can confirm this statement from our own experience, so far as the pains ascribed to neuritis are the reflex of an inflammatory process taking place in the shoulder-joint, but we should not use the word 'arthritis' to describe this condition. It is due to deposits of urates in the joint undergoing decomposition with inflammatory reaction. This process is commonly called 'gout.' Even in cases of 'neuritis of the arm' which are primarily due to injury of the brachial plexus, generally from overstretching of the nerve trunks, the condition of the nerve is asthenic, and a treatment is called for which would be contra-indicated if a true neuritis existed.

In respect to the word 'arthritis,' perhaps 60 per cent of the cases of 'arthritis of the knee-joint' which come under our notice are cases of chronic synovitis with effusion of fluid. Such cases require early and decisive treatment, and can be cured in a few weeks. The term 'arthritis' is usually accompanied by a bad prognosis, which may become justified because proper treatment is not given, and continued irritation may cause destructive changes in the joints.

Foster has made considerable research on the subject of *Trachoma*, and we are able to reproduce a number of illustrations of this disease which will be of interest to our readers (*Conjunctiva, Diseases of*). Dr. Priestley Smith's valuable work upon the blood-pressure in the eye and its relation to the chamber pressure has been continued, and is reported by Mr. Foster Moore. We give an instructive plate to illustrate this subject (*Eye, Physiology of*).

The method of extracting the lens in operations for *Cataract* by vacuum aspiration has been used with great success by Wieden in 127 cases. The method consists in applying a cupping instrument to the

anterior surface of the lens, and by its means drawing out the lens in its capsule.

An ocular therapeutic lamp has been introduced. It is a 50-watt electric light with a violet glass globe, and has been used with success in the treatment of corneal ulcers, iritis, ciliary neuralgia, etc. (*Eye Affections, General Therapeutics of*).

The operation of sclerocorneal trephining has been advocated as superior to iridectomy in cases of glaucoma, especially in the hæmorrhagic form. The method is described by Foster Moore under *Glaucoma*.

The infant has suffered much at the hands of the dietist and the manufacturer of proprietary foods. We can make a child very fat by excess of fats or carbohydrates, but we also make him more prone to illness. Excess of protein was the German weakness. The mother's milk is best, and cows' milk comes second. At a time when the milk question has become difficult, it is satisfactory to know that dried milk has proved an efficient substitute. Unsweetened full-cream condensed milk is also very useful, the sweetened containing too much sugar.

Levinson urges the use of a 5 per cent oatmeal gruel, and claims that it can be given at any age (*Infant Feeding*).

For infantile *Diarrhœa* in children over twelve months of age, Lowenberg recommends starvation for twenty-four or thirty-six hours, the only food allowed being tea sweetened with saccharin; this is given very freely. He furnishes detailed instructions for the subsequent treatment of the child.

In the *Ileocolitis* of infants, J. Aikman omits milk altogether and gives cereal water, with or without sugar, and also advocates the use of fresh weak tea.

Dr. F. Langmead reports some researches which show that calcium produces a prompt effect upon the course of *Tetany*, the spasmodic symptoms disappearing in a few hours.

In the article *Vulvo-vaginitis of Children*, a large number of remedies are mentioned which have been used with little success to cure this trouble, but we see no mention of the ung. hydrarg. ammon. which we have always regarded as the most efficient remedy because of its power to penetrate the skin, which is not the case with ordinary antiseptics or nitrate of silver preparations.

Bromoform as a remedy for *Whooping-cough* has proved a failure, but Allan, who has long experience of its use, considers that this is due to the wrong method of administration and not the fault of the remedy. He uses 1 min. every four hours, and increases the dose with the age of the patient. Three drops have produced very severe symptoms in a child of four years, and 2 drops in one of fifteen months. (*U.S. Dispensatory*, p. 247.)

Gismondi strongly recommends the use of cod-liver oil combined with phosphorus as a remedy for *Rickets*. He combines its use with calcium acetate, and says that a much larger quantity is retained than of the phosphate or citrate of calcium.

The conservation of the sound ovary is much desired by patients who have to suffer operation, and there are reasons which make the surgeon loth to remove it. Some very important researches on this question are reported by Dr. W. E. Fothergill (*Ovary*).

The same writer gives some very instructive suggestions respecting the habit of vaginal douching. In the article *Vagina, Diseases of*, he advises that in many cases where they are habitually ordered they are better avoided. Under *Puerperal Infection*, attention is called to the value of arsenobenzol in destroying the streptococci. It appears to influence all forms of invading organisms, and may prove useful in other forms of blood poisoning.

Both in acute and chronic gonorrhœa, the use of alkaline drinks should be avoided, as an acid urine is a safeguard against cystitis. In the acute stage, sandalwood oil in full doses retains its place. Sulphurous anhydride gas has been recommended in preference to injections, and is said to reach the glandular diverticula, which fluids fail to penetrate. The method is described in Dr. Marshall's review of *Gonorrhœa*.

In the treatment of *Syphilis*, most recent authorities recommend the combined use of mercury with salvarsan. Intravenous injections of arsenious and mercuric iodide have been also employed, and the results are said to be only a little less rapid than those obtained by salvarsan, and are superior in respect to the absorption of infiltrations.

Dr. Irwin Moore's operation of laryngo-fissure for removal of cancer of the larynx is described and illustrated by Dr. Watson-Williams in his paper *Larynx, Cancer of*. Dr. Irwin Moore considers that the

tracheotomy tube may be removed directly after operation in the majority of cases.

Mackenty's operation of hemilaryngectomy is described in the same article. The use of radium in malignant disease of the upper air passages is also discussed. Mink considers that the tonsils are of great value to respiration, and that one of their functions is to supply moisture to the relatively dry air current going to the lungs. The question of hæmorrhage from the tonsils following operation is very fully considered (*Tonsils*). Pituitary extract has been used with good results; also horse serum and calcium lactate receive favourable mention. Watson-Williams's hæmostatic forceps have been used with great success to check hæmorrhage secondary to operation. They are illustrated in the text.

For the treatment of *Diabetes* the lines of treatment most favoured are on the principle of reduction or starvation. Dr. John D. Comrie gives some diet tables in his article which are useful for about one week at a time. Attention has been called to the value of large doses of salicylate of soda and acetylsalicylic acid. Poulton says that in long-standing cases of acidosis there is a draining of many inorganic substances from the body, and it is a good plan to supply them by the mouth, i.e., potash, soda, lime, and magnesia.

An interesting point in pharmacology is demonstrated by the fact that emetine, which is so effective in amœbic disease, was powerless in kittens infected with the same amœba. This shows that the efficiency of emetine must depend on its action upon the human body rather than on the parasite. The same result appeared in the experiments with Chaparro amargosa, a Mexican plant. It was found very active in amœbic dysentery, even when emetine had failed, but was found to have no action upon the amœbæ when directly applied to them (*Amœbiasis*).

For bacillary dysentery, serum treatment has had further trials, with satisfactory results (*Dysentery*).

The relationship of rats to infective jaundice seems to be proved. It is thought that trench fever, five-day fever, and possibly yellow fever may have an origin in common with infective jaundice (*Jaundice, Infective*).

Sir Leonard Rogers records further cases of *Leprosy* treated with the gynocardate of soda with satisfactory results. Also intramuscular injections of chaulmoogra oil have received further trials.

To prevent relapse in *Malaria*, large doses of quinine are advocated; 45 gr. on two consecutive days, each week for eight weeks, gave good results.

Tropical Ulcers are curetted and then treated with salt solution, which is also injected into the base.

In the article *Trypanosomiasis*, Sir Leonard Rogers mentions that he has been using a colloidal antimony preparation in kala-azar with good results, and thinks it is worth trying in sleeping sickness.

Cholera is claimed to be "a syndrome of acute suprarenal insufficiency," and adrenalin is advised to be used systematically in its treatment (*Adrenalin*, Dictionary of Remedies). Sir Leonard Rogers confirms the value of intravenous injections of sodium bicarbonate in the prevention of post-choleraic uræmia.

Blood Transfusion is believed to be the most valuable remedy we possess in the treatment of pernicious anæmia. Mr. Rendle Short's review of this subject deals very fully with the technique, and is fully illustrated. Great advance has been made in our knowledge of transfusion, and the article is of much practical value.

Dr. Herbert French (*Anæmia, Pernicious*), speaking of transfusion of blood and splenectomy as remedies, says that "when one considers the expense and trouble of repeated transfusions in addition to splenectomy, one feels that the results need to be much more encouraging than they have proved up to the present before one is justified in urging strongly this line of treatment in preference to arsenic and '606.'"

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Charcoal appears to have been used with some success in the treatment of *Colitis*.

Under the heading *Dyspepsia, Atonic*, Dr. Robert Hutchison attaches considerable importance to the question of rest, especially one hour after lunch and half an hour before dinner. He advises frequent small meals, making lunch the most important. The value of a proper abdominal support in many cases is also mentioned. Unquestionably enteroptosis is a common cause of chronic digestive trouble.

Carter is of opinion that all cases of chronic gastric and duodenal ulcer should be given the chance of a thorough medical cure before being submitted to operation, and that after operation they should again come under the care of the physician for careful dieting (*Gastro-enterostomy*). A remedy which we have used with great success in both forms of ulceration is argentic nitrate in small doses and well diluted. It is pointed out that the symptom of heartburn is not always due to hyper-

acidity ; it is often a neurosis, due to a hyperæsthesia of the gastric mucous membrane. Small doses of bromide and chloral have proved helpful in some of these cases (*Heartburn*).

Carbonate of magnesia has lately been recommended as a remedy for cancer in doses of 120 to 180 gr. daily. It is explained that diminution of magnesia in the tissue content favours the onset of cancer. For many years we have held the view that an acid condition of the tissues or diminished alkalinity of the blood favoured new growths, whether malignant or benign, and we have seen material improvement in advanced cases of cancer by the use of fairly large doses of citrate of potash. This line of thought appears worthy of fuller investigation (*Magnesium*, Dictionary of Remedies).

Radium appears to have given good results in carcinoma of the bladder and prostate. Barringer considers that good results depend on early treatment and direct application to the growth (*Bladder, Surgery of*).

Incontinence of Urine is said to be relieved by the use of pituitrin, in both children and adults, due, it is supposed, to its action on the involuntary muscular fibres of the bladder (*Pituitrin*, Dictionary of Remedies).

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Sea-sickness is claimed to be due to "a nervous inhibition of suprarenal functioning." Doses of 25 to 30 min. of the 1-1000 solution are recommended one and a half hours before meals, until three doses have been taken (*Adrenalin*, Dictionary of Remedies).

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The Metric system is official in Great Britain, but is ignored by the British practitioner. The authorities retaliate by ignoring the weights and measures which we use to dispense our prescriptions. In these democratic days when 'self-determination' is admissible, such a condition of affairs should not exist. Our profession have a right to be consulted upon a matter which concerns them so deeply. In this case it could have been pointed out that an easily divisible unit is essential both for pharmacy and prescription writing. The astronomers of Ancient Babylon considered the whole question, and proved that the figure 12 and its multiples formed the best standard of measurement because of its divisibility. They rejected the decimal system because 10 can only be divided by 2 or 5, unless the result is expressed in fractions.

There have been many changes in other things since then, but not in numbers. The duodecimal scale remains the most convenient because it avoids fractions. The only excuse for adopting the metric system is to secure uniformity, but it was a deliberate object of the founders of the metric system to invent something which should have no relation to any existing system of measurement. They deliberately took a fraction of a quadrant of the meridian and called it a 'metre.' The standard is purely arbitrary, and would only be useful if the measurement of the circumference of the earth were one of the daily occupations of life. When we have divided it or multiplied it by 10 and its multiples we can seldom express any part of it without running into decimal fractions and writing down an array of figures not easy to remember. The English 'yard' represents 36 inches or 432 lines. We can divide it by 2, 3, 4, 6, 9, or 12 and have always a whole number, and when we have divided it by 12 it gives us 3 inches or 36 lines, which are again divisible by the same numbers. This is not only practical but scientific. In the apothecaries' scale we have the ounce, which contains 480 gr. This is divisible by 2, 3, 4, 5, 6, 8, 10, and 12. We have the drachm of 60 gr., which is divisible by the same numbers except 8. It would be impossible to invent any scale which was more practically adapted to the requirements of the dispenser. We can sympathize with our Continental colleagues, but we see no necessity to share their misfortunes; on the contrary, we hope they will see the advantage we possess and adopt our more practical and *scientific* system.

THE MEDICAL ANNUAL.

Part I.—Materia Medica and Therapeutics.

DICTIONARY OF REMEDIES.

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ADRENALIN (Epinephrin).

Nägeli¹ has found the preliminary intramuscular injection of 1 c.c. of 1-1000 solution of adrenalin successful in warding off the erythematous rash which otherwise invariably followed the intravenous injection of neosalvarsan. To be effective the adrenalin injection had to be given at least five minutes before the neosalvarsan. Oral administration proved ineffectual. He has also seen excellent results from adrenalin in arresting the disturbances in a severe case of meningeal irritation after neosalvarsan. Apparently adrenalin may be of use in other cases of **Medicinal Intolerance**, as he found that it effectually warded off violent diarrhœa produced in three patients by administration of mercury.

Naame² insists that **Cholera** is a syndrome of acute suprarenal insufficiency, and that adrenalin should be given systematically in cholera. He further ascribes the symptoms of **Sea-sickness** to suprarenal insufficiency resulting from purely nervous inhibition of suprarenal functioning. The constant swaying causes the viscera to impinge on the solar plexus, and this, he thinks, inhibits normal suprarenal functioning. He has found that 5 to 6 mgrams. adrenalin, fractioned in three doses at intervals for an hour and a half before meals, is effectual in controlling sea-sickness. The sickness subsides and food can be taken. It acts similarly on railway sickness.

Milian³ is convinced that adrenalin, properly administered, will ward off and cure all disagreeable or alarming **Side-actions of Salvarsan**. He advises somewhat larger dosage than usual, and has given 2, 3, or 4 mgrms. of adrenalin within a few minutes. He advises oral administration, giving 2 mgrms. in a little water one hour before, and a similar dose five minutes before, the intravenous injection, and another dose an hour after the injection. If the patient is intolerant of salvarsan, he continues to give 1 mgrm. night and morning for the next four days. Such treatment prevents fever, headache, sickness, and diarrhœa. When there is risk of immediate congestive, nitritoid crises, he replaces the second oral dose given five minutes before the injection by the subcutaneous injection of 1 mgrm. and the intramuscular injection of 0.5 mgrm. The effect of this is to produce blanching of the face, increased arterial pressure, tachycardia, and general tremor. Intravenous injection is reserved for serious emergencies. For it he advises the use of a small dose of 0.1 mgrm. diluted with 100 c.c. normal saline. This immediately arrests an asthmaticiform nitritoid attack. He suggests that other glands with

internal secretion may usefully supplement adrenalin, as adrenalin does not affect the cerebral vessels and coronaries so much as the aorta. He suggests that pituitrin might have more effect upon the coronary and cerebral circulation.

Auer and Meltzer¹ advise the intraspinal injection of adrenalin in acute or subchronic cases accompanied by **Low Blood-pressure**. The rise in blood-pressure is comparatively slow, but is much more prolonged in action. They advise an initial dose of not less than 3 c.c. of 1-1000 solution. Thirty or forty minutes after the intraspinal injection a subcutaneous injection can be given.

[Adrenalin is too unstable to be dispensed in its solid form, and is usually supplied in the 1-1000 solution. Of this solution 1 mgrm. is contained in 17 min., 3 c.c. of 1-1000 solution is equivalent to 50 min.; 100 c.c. of normal saline is equivalent to 3½ oz.—ED. MED. ANN.]

REFERENCES.—¹*Corresp.-bl. f. Schweizer Aerzte* (abstr. *Jour. Amer. Med. Assoc.* 1917, ii, 1743); ²*Paris Méd.* (abstr. *Ibid.* 1918, i, 132); ³*Ibid.* (abstr. *Ibid.* 1041); ⁴*Jour. Amer. Med. Assoc.* 1918, i, 70.

ALOES.

Pugnat¹ states that the immediate local application of a saturated solution of aloes in alcohol is of material benefit in the treatment of **Insect Bites, Wasp Stings, and Mosquito Bites**. If the alcoholic solution is rubbed in immediately, no local or general reaction develops.

REFERENCE.—¹*Jour. de Méd. et de Chir. Prat.* 1918, Mar. 25 (abstr. *Pract.* 1918, i, 455).

ALYPIN.

Jacobs¹ reports two cases of *toxic action* due to the local use of alypin. In each case 2 dr. of a 2 per cent solution was injected into the urethra, after which instruments were introduced. The toxic symptoms developed immediately on introducing the instruments, and consisted of respiratory distress. In one case there were clonic followed by tonic spasms, with cyanosis and spasmodic contraction of the jaws. The other patient's respiration ceased entirely. Both recovered under prolonged artificial respiration and tongue traction.

REFERENCE.—¹*California State Jour. Med.* 1917 (abstr. *Surg. Gyn. and Obst.* 1917, ii, 276.)

APOMORPHINE.

Douglas¹ strongly advises the use of small doses of apomorphine as a rapidly acting **Hypnotic**. A valuable combination for a prompt emergency hypnotic consists of 0.005 gr. to 0.01 gr. hyoscine and 0.02 gr. to 0.025 gr. of apomorphine injected hypodermically. The hypnotic action is quickly and safely obtained. The combination is valuable in the treatment of the excitement stage of alcoholism and other mental ailments.

REFERENCE.—¹*N. Y. Med. Jour.* 1917, ii, 1032.

COPPER SULPHATE.

Mauté¹ claims that the local application of black oxide of copper or of sulphate of copper exerts an almost specific action in curing **Streptococcic Skin Diseases**. He prefers a watery solution of 1-1000 of copper sulphate, which he finds very useful in ecthyma and impetigo. He immerses the affected part, if possible, for one hour in a hot bath of 1-1000 copper sulphate. In bullous ecthymas the bullæ are opened with blunt scissors. Then a wet dressing of the same solution is applied, and renewed twice daily. From day to day the strength of the solution may be increased to 1-500 and then to 1-250. The lesions rapidly improve, redness disappearing within twenty-four

hours, and rapidly dry up. Though apparently specific against the streptococcus, the solution has no marked action against the staphylococcus. For cases with complicating eczema, copper sulphate may be used as an ointment containing 10 per cent. He has tested the specific action in streptococcic infections of the skin by intravenous injections of copper ammonium sulphate, and finds that without any local treatment a remarkably rapid therapeutic action is obtained, comparable only to that of mercury and arsenobenzol in syphilis. He employs a 4 per cent aqueous solution, and starts with a dose of 2 cgrms., which is increased daily or every second day to 4, and then to 8, 12, 16, and if necessary up to 20 cgrms. In purely streptococcic skin conditions very rapid improvement is obtained. He has not had much opportunity of testing the efficacy of these intravenous injections in streptococcic infections of the blood-stream, but believes that benefit will also be obtained in these conditions.

[The author leaves us to calculate the number of minims of a 4 per cent solution we must use to give doses of 2, 4, 8, 12, 16 cgrms. A dose of 2 cgrms. = 8 min., 4 cgrms. = 16 min., 12 cgrms. = 48 min., and 16 cgrm. = 64 min. A dose of 20 cgrms. is equal to 3 gr. We think such a dose given by intravenous injection would be more likely to produce the toxic effects of copper than its therapeutic advantages.]

Sulphate of copper has a reputation for the cure of dry skin eruptions when given by the mouth in small doses.

We use a 1 per cent solution of the sulphate or acetate in doses of 3 to 10 drops, well diluted with water, after meals.

There is no evidence to show that intravenous injections have any advantage over the remedy given by the mouth.

Incidentally we may mention that this remedy is almost specific in nocturnal cramp.—ED. MED. ANN.]

REFERENCE.—*Presse Méd.* 1918, July 22, 377.

ERODIUM CICUTARIUM.

Van Douge¹ finds this drug a useful substitute for hydrastis. Its action on the uterus is somewhat similar. In virgins good results were obtained in menorrhagia and metrorrhagia, and in the hæmorrhages due to lesions of the tubes and ovaries and the menopause. It seems a **Uterine Hæmostatic** worth further investigation.

[*Erodium cicutarium* (stork's-bill) is an annual plant belonging to the Geraniaceæ. It was recommended by W. Abbots Smith as a remedy for Dropsy (*Amer. Jour. Med. Sci.*, 1865). We have no particulars of preparation or dose.—ED. MED. ANN.]

REFERENCE.—¹*Arch. Mens. d'Obst. et de Gyn.* 1917 (abstr. *Edin. Med. Jour.* 1917, Dec., 295).

GARLIC.

Minchin¹ begins his article with the statement that there is probably no more valuable drug mentioned in any pharmacopœia than oleum allii, the active oil of garlic. He claims that it is antiseptic and of great value in the treatment of **Pulmonary Diseases** by inhalation. Locally applied to **Wounds** it penetrates readily and exerts a favourable action on healing. The wound is first washed clean with any antiseptic, and then dressed with a solution of the succus allii diluted 1-4 with water, or an ointment may be used containing 25 to 50 per cent in vaseline. Garlic rapidly neutralizes the poison of **Stinging Insects**. It is very useful in **Diphtheria** and **Septic Throats**. In **Tuberculosis** he considers it of great value in pulmonary and localized forms, provided we

are not dealing with a surgical condition—sequestrum, a mass of gangrenous soft tissue intimately mixed with pus, or a shut-away stagnant pocket of pus. Garman² and MacClosky³ record cases of septic pulmonary conditions in which recovery took place after the inhalation and oral administration of succus allii.

REFERENCES.—¹*Pract.* 1918, Feb. 145; ²*Med. Press and Circ.* 1917, ii, 242; ³*Ibid.* 399.

GELATIN.

Dershimer¹ finds that the soft gelatin capsule is relatively insoluble in the stomach. Artificial acid pepsin digestion showed that whereas hard gelatin capsules release their contents in four minutes, soft gelatin capsules resist acidified pepsin solutions for from four to over twenty-four hours. He concludes that drugs should not be administered in soft gelatin capsules.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1917, ii, 1508.

GLUCOSE.

In combating serious diseases, Litchfield¹ considers that we have to meet three indications—intoxication, dehydration, and nitrogen starvation. Of these, dehydration is least appreciated. Yet a proper supply of water in the blood and tissue is necessary for important biochemical reaction in cell life, for carrying nourishment to, and removing waste product from, the tissues, etc. Without water the fasting organism cannot properly utilize its fat and protein for the supply of energy. When water is removed from the blood by natural processes and not replaced immediately, blood abstracts fluid from the tissues. An abnormal and often dangerous loss of water is occasioned in many clinical conditions, e.g., gastro-intestinal irritation, acidosis, hæmorrhage, and sudden and large inflammatory exudates into serous sacs. This dehydration, associated with sepsis, intoxication, and starvation, shows the following clinical picture: rapid respiration, rapid small thready pulse with diminished amplitude and lowering of systolic blood-pressure, tongue dry and parched, skin dry, features pinched, and sunken eyeballs; patient looks toxic, rapidly becomes weaker and apathetic, declining food and fluid. The therapeutic problem is to supply fluid, make good the deficiency of previous days, give energy to the tissues, and spare body nitrogen. He thinks that injection intravenously of hypertonic glucose solution meets these indications, as it is non-toxic, is quickly utilized, and is a good sparer of nitrogen. When it is used the general appearance rapidly improves. Respiration becomes slower, and the pulse slower and fuller. The apathy disappears, the patient is brighter, and asks for food and fluid. He uses 250 c.c. of a 25 per cent solution of glucose. Any pure glucose may be used. The water employed should be filtered and doubly distilled. The glucose solution is sterilized by boiling or by autoclave. It is injected at a temperature of 100° through a small needle. The injection takes about an hour, and may be repeated, if indicated, at intervals of from eight to twenty-four hours. Good clinical results were obtained in **Pneumonia, Meningitis, Typhoid Fever, Septic Peritonitis, Empyema, and Brain Abscess.** Surgeons find it useful both before and after operation in desperate risks, to prepare patients for operation, and in various post-operative conditions. A rigor may follow the injection, but does not interfere with its value.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1918, ii, 503.

LIPOVACCINES.

Vaccines made with oil instead of saline solution have recently been tried. Certain advantages are claimed for these lipovaccines. Whitmore, Fennel, and Petersen¹ point out that they permit the use of a larger dose, slower

absorption, and less marked local and systemic reaction. Thus enough can be given to produce efficient immunity with a single injection. It is claimed further that the lipovaccines do not undergo autolysis or deteriorate. Further, the lipid material acts as a detoxicating agent, thus permitting the employment of vaccines which are markedly toxic when given as aqueous suspensions. That the lipovaccines are active is shown by the production of agglutinins, precipitins, and bacteriolysins. The mechanical production of the lipovaccines is more troublesome than that of aqueous vaccine, but Whitmore and Fennel² state that they can be made on a large scale by growing the bacteria in Kolle flasks, taking off the growth with a vacuum scraper, freezing and drying the bacterial mass in vacuo; then grinding it for forty-eight hours, using steel ball bearings in wide-stoppered glass vessels; then a little lanolin is added, and grinding continued for a further twenty-four hours; finally olive or sperm oil is added and the whole ground together for another twenty-four hours. The final oil mixture is sterilized by heating to 53° C. for one hour on a water-bath. The oils should be sterilized by steam in an autoclave at 15 pounds for fifteen minutes, or by heating to 90° C. for ten hours, or by adding potassium iodide and allowing it to act for three days.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1918, i, 427; ²*Ibid.* 902.

MAGNESIUM.

Certain French writers have recently advocated the administration of magnesium in **Cancer**. In advancing age magnesia in the tissues is replaced by lime. It is suggested that the diminution in the tissue content of magnesia favours the onset and development of cancer. Dubard¹ advises the prolonged oral administration of magnesium carbonate, 120 to 180 gr. per diem. His statistics indicate that cancerous patients receiving magnesium carbonate live longer than patients not receiving it. Regnault, after observing the beneficial action of magnesium salts on **Warts**, was led to prescribe for papilloma and superficial epithelioma a powder consisting of 4 gr. each of magnesium hydroxide and magnesium silicate. The results were satisfactory, and even in inoperable cases there is great diminution in pain, improvement in the general condition, and apparent arrest of the disease. He therefore advises the routine administration of magnesium after operation for cancer to prevent recurrences. He states that it has already been noted by Robin that magnesia is present in the defensive zone around new growths, and Delbet and Karajanopoulos have shown that the intravenous injection of magnesium chloride increases both the number and activity of phagocytes.

REFERENCE.—¹*Brit. Med. Jour.* 1918, ii, 118.

MERCURY.

Schamberg, Kolmer, and Raiziss¹ continue their observations on the action of mercury. The latest point taken up was how mercury is absorbed when applied to the skin. Welander suggested that the main absorption took place through the lung from volatilization of mercury from the skin, but Schamberg and his associates state that the main absorption is by the skin. By inunction, fatal mercurial poisoning can be induced where there is no opportunity for lung absorption. Even under conditions where there is respiratory absorption, it is much less important than cutaneous absorption. Mercury ointment is more volatile than calomel ointment, but the latter is readily absorbed through the skin, and in their opinion might supplant the unclean blue ointment at present used for inunction.

Sansum² has tested the effect of free diuresis in experimental poisoning with *mercuric chloride*. In dogs he finds that the minimum lethal dose is 4 mgrms.

per kilo. Against such dosage even free diuresis produces no prolongation of life. He is inclined to believe that the main point in treatment should be to prevent absorption from the alimentary canal and promote elimination from the bowel.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1918, i, 142; ²*Ibid.* 824.

OLIVE OIL.

Asnis¹ states that the diseases of the stomach benefited by olive oil, either alone or in combination with other drugs, are **Hyperacidity**; **Erosions, Ulcers, Fissures**; **Pyloric Spasm**; **Diseases of the Biliary Tract**, such as cholecystitis. In hyperacidity the oil reduces the secretion of hydrochloric acid, and acts as a lubricant and protectant, which remains for a long period in the stomach and is not affected by acid. Similarly, in pyloric spasm, it acts as antacid, protective, and antispasmodic. As a drug its action is purely local, non-toxic, and free from any risk of cumulative effect; but after leaving the stomach it acts as a food and laxative.

REFERENCE.—¹*Proctologist and Gastroenterologist*, 1917, June. (abstr. *Ther. Gaz.* 1918, Jan. 15, 36).

PHOSPHORUS.

Phemister¹ has investigated the effect produced by prolonged administration of phosphorus on the growth of bone in young children. He controlled the effect by means of the *x* ray. Normal bones of young children are affected in much the same way as described by Wegner for experimental animals. After several months' treatment dense shadows form just above the epiphyseal line. There was little obvious increase in the transverse growth of the shafts. After the administration of phosphorus is stopped there is continued but less marked over-production of bone in the juxta-epiphyseal region of the shaft, which is probably due either to the cumulative effect of phosphorus or to the stimulating influence of excessive stores of calcium salts on the neighbouring bone. He also studied the effects of phosphorus treatment in abnormal conditions of bone-formation. In a case of dyschondroplasia the phosphorus produced the usual dense area in the affected region previously consisting of hyaline cartilage, but no increase in length took place in the shortened bone. In another case of osteogenesis imperfecta there was increase in the width of the bone.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1918, i, 1737.

PITGLANDIN.

This is an extract from the anterior lobe of the pituitary gland, and is stated by Scott¹ to be practically non-toxic. He suggests its use in cases of delayed or defective development. He finds it a valuable and safe restorer of power in feebleness of old age. In old age he gives it either singly or in combination with hormotones, e.g., by Carnrick's pluriglandular combination of ovarian, testicular, and anterior pituitary extracts.

REFERENCE.—¹*Pract.* 1917, Nov., 474.

PITUITRIN.

Mikhailoff¹ reports nineteen cases of nocturnal incontinence of urine in children and adults in which prompt benefit followed administration of pituitrin. He considers the good results due to the selective action on the unstriated muscle tissue of which the bladder sphincter is composed. The details of administration are not recorded, but apparently the drug was given by injection. It is

definitely stated that the patients had no recurrence of incontinence during the three or four months following treatment.

REFERENCE.—¹*Russkij Wratsch.* 1917, June 17 (abstr. *Jour. Amer. Med. Assoc.* 1917, ii, 2077).

SEROTHERAPY.

Williams and Patterson¹ find that many commercial curative serums produce agglutination of washed human blood corpuscles in experiments in vitro. They raise the possibility that fatal results after the intravenous injection of large doses of horse serum may be due to this factor to some extent. Neither the presence of antiseptics and preservatives nor the age of the serum removes the agglutinating power. They suggest that a useful precaution would be to examine the agglutinating power of any horse against human corpuscles before selecting it for immunization.

Briz² states that he has found polyvalent antistreptococcus serum of value in **Erysipelas of the Newborn**. He gives three or four injections of 10 c.c. of serum, and combines this with local dressings or spraying of 1-1000 perchloride of mercury.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1918, i, 1754; ²*Siglo Medico* (abstr. *Amer. Jour. Med. Assoc.* 1918, ii, 235).

SODIUM CYANIDE.

Experiments on animals had shown that a freshly prepared 1 per cent solution of sodium cyanide in normal salt solution exerted a marked stimulant action on respiration when given intravenously in cases of respiratory depression from chloroform, morphine, and ether, and in artificially increased intracranial pressure. Loevenhart, Lorenz, Martin, and Malone then tested the action in man. They find that with a single injection, after a latent period of twenty seconds, the respiration is stimulated for not more than half a minute. A mild continued respiratory stimulation may be kept up by running into the vein from a burette at the rate of 1 c.c. of the 1 per cent solution every fifteen to thirty seconds. This is usually a safe rate, but too rapid injection produces pallor, nausea, marked increase of pulse, and depression of respiration. It is suggested that this use of the drug may be of value in **Depression of Respiration** from increased intracranial pressure, during chloroform or ether anaesthesia, and in resuscitation from drowning.

REFERENCE.—*Arch. Internal Med.* 1918, Jan.

STANNOXYL.

This new drug has been used by French observers in the treatment of **Staphylococci Infections**, and is stated to have a specific action. It appears that the more nearly the conditions of culture in the body are anaerobic, the more effective is stannoxyl in rendering the body tissues unsuitable for staphylococci to live in. Compton¹ has recently investigated the effect of the drug in mixed infection of **Pulmonary Tubercle**. Here the organisms are more nearly under aerobic conditions. He found that though the staphylococci and associated germs are not removed from the sputum, the stannoxyl treatment produces, after two or three weeks, a marked improvement in the general condition of the patient and reduction of temperature to normal. He thinks that this benefit possibly arises from the drug when present in tissues producing an attenuation of the virulence of the germs. (*See also SKIN, STAPHYLOCOCCIC INFECTIONS OF.*)

REFERENCE.—¹*Lancet*, 1918, ii, 234.

THROMBOPLASTIN.

This tissue extract is an efficient **Hæmostatic** when applied locally to the bleeding point. It is a simple tissue extract, a watery solution and suspension of brain tissue. In dilute solution it can be sterilized with heat or by the addition of tricresol. Its coagulant effect is produced by direct action on the blood; only a slight vasoconstrictor effect is produced on the vessels. In addition to its coagulant action, it also stimulates healing of wounded surfaces. According to Hess,¹ thromboplastin is indicated in the bleeding of hæmophilia, local hæmorrhages in the nasopharynx, and generally in controlling hæmorrhage in cavities where ligatures cannot be employed.

REFERENCE.—¹*N. Y. Med. Jour.* 1917, ii, 529.

URANIUM NITRATE.

Wilcox¹ describes the therapeutic uses of this drug. He points out that animal experiments show that when injected intravenously it produces a characteristic nephritis, glycosuria, and a peculiar œdema. In small repeated intravenous injections a chronic interstitial nephritis is produced without general arterial lesions. Single intravenous injections of considerable doses produce degeneration, necrosis, and desquamation of the tubular and glomerular epithelium. There is generally albuminuria and glycosuria, with or without hyperglycæmia. The characteristic dropsy is only seen when the experimental animal is freely supplied with water; and is apparently due to an increased permeability of the capillary wall. It is not due simply to the nephritis. These pharmacological actions do not seem to explain the therapeutic action of the drug, possibly because it is imperfectly absorbed from the intestinal tract. In small quantities it inhibits the action of ptyalin, pepsin, and trypsin. Possibly its action in **Diabetic Conditions** may be due to this interfering action on the digestive ferments. In diabetes its good effect seems strictly limited to the hepatic and pancreatic types of the disease. It is of no value in neurotic types or in diabetes insipidus. The effect of the daily administration of from $\frac{1}{2}$ to $1\frac{1}{2}$ gr. was to diminish thirst, polyuria, and glycosuria. Even when continued in this dosage for months, no disturbance of the kidneys or gastro-intestinal function has been observed.

REFERENCE.—¹*Med. Rec.* 1917, ii, 361.

YEAST, BAKER'S.

Hawk, Knowles, Rehfuß, and Clarke,¹ have tested the value of ordinary baker's yeast in diseases of the skin and of the gastro-intestinal tract. It proves as efficacious as brewer's yeast, hitherto generally employed. Fresh baker's yeast may be administered, either with meals or on an empty stomach, suspended in water, beef-tea, or orange-juice. Yeast is not easily destroyed in the human stomach, and a large part of the yeast survives and passes into the intestine alive, especially if given between meals. Yeast treatment gave the best results in **Furunculosis**, **Acne Vulgaris**, **Acne Rosacea**, and **Constipation**. The laxative effect is met in all varieties of disease, and may be so pronounced as to require reduction of the dose. Even yeast killed by immersion in boiling water exerts a laxative action. When the patient is troubled with gas formation, it is preferable to use killed yeast or give living yeast on an empty stomach. As a general rule the dosage employed was one tablet of Fleischmann's compressed yeast thrice daily. In furunculosis comparatively rapid improvement resulted, and most of the cases required yeast administration for two weeks. In the acnes the yeast administration was usually kept up for four weeks. About the same length of treatment was employed in cases of constipation.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1917, ii, 1243.

BLOOD TRANSFUSION.

By A. RENDLE SHORT, M.D., B.S., F.R.C.S.,

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It has passed into a hackneyed phrase to speak of 'infusing new blood' into a committee or commercial undertaking; but until the past year or two the procedure has been more metaphorical than literal in Great Britain. In America blood transfusion has made immense strides. There is no doubt, now that so many medical officers have learned its value in France, that it will become a common and well-established method of treatment in this country. The wide employment of blood transfusion is one of the principal medical advances of the year.

It is well known that animal's blood, or preserved serum, cannot be used, as violent toxic symptoms are produced if any considerable quantity is injected.

Indications for Blood Transfusion, and Results.—The following are the principal indications:—

1. *Severe Primary Hæmorrhage.*—It is in this condition that the treatment finds its most obvious rationale and its most spectacular successes. A great number of surgeons at casualty clearing stations in France are deeply impressed with the value of the method. Out of the first 20 cases transfused by myself or by others at my casualty clearing station, 14 recovered from the shock, but of these 6 died afterwards of gas gangrene or other complications. The other 8 went down to the base well. In 6 cases there was no obvious improvement (2 gunshot wounds of abdomen, 2 gas gangrene, and 2 in which direct transfusion was tried but little, if any, blood passed).

Blood transfusion is immensely better than saline transfusion, both in animals and in clinical experience. After saline has been given, the patient often improves for a few hours but then falls away again; after blood transfusion the immediate benefit may or may not be very striking, but the patients remain better.

The following figures are given by various writers during the past year. Capt. O. H. Robertson's cases overlap mine slightly. They are all war records.

RESULTS OF BLOOD TRANSFUSION FOR SHOCK AND HÆMORRHAGE.

Reporter	Cases	Recovered	Improved, but died later	No Benefit	Harmful Hæmolysis
O. H. Robertson ¹ ..	38	25	13	—	0
Bruce Robertson ² ..	57	36	15	4	2
Murard ³ ..	40	13	10	17	0
Rendle Short ..	20	8	6	6	0

O. H. Robertson and I used a citrate method, Bruce Robertson the Lindemann syringe, and Murard the Jeanbrau modification of Kimpton's method. The failures were mostly due to gas gangrene or severe sepsis.

2. *Pernicious Anæmia.*—Unger,⁴ Kimpton,⁵ and others believe that blood transfusion is the best treatment we have for pernicious anæmia. It appears

to act not so much by directly increasing the volume or oxygen-carrying power of the blood, but by stimulating the red marrow to renewed activity and so bringing on a remission of the anæmia. Unger reports 23 transfusions for 15 cases. "The lives of five patients were saved as a direct result of the transfusions; five were greatly improved; the remaining five died within a comparatively short time. As a result of repeated transfusion, two have done well for a period of about two years, and another for a period of eight months." It is not claimed that permanent cure will be obtained. Small transfusions seem to do as well as large. Unger uses his own technique (*vide infra*).

3. *Hæmophilia*.—Unger gave eight transfusions for seven patients, and all recovered. In five cases the procedure was life-saving. It checks the bleeding but does not cure the disease.

4. *Anæmia*.—The method is of use for secondary anæmia, whatever the cause. Kerley⁶ reports good results in the secondary anæmias of children under 2 years of age. Seven out of eight cases did well. (*See also ANÆMIA IN INFANTS.*)

In leukæmia and purpura hæmorrhagica the results were not good (Unger).

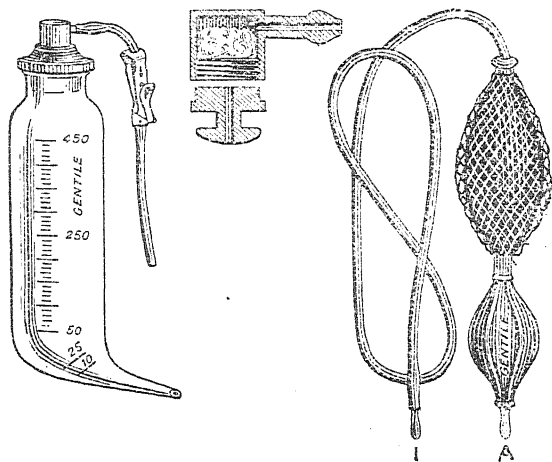


Fig. 1.—Apparatus for blood transfusion (Jeanbrau).

5. *Staphylococcus Septicæmia*.—Hooker⁷ relates five cases of osteomyelitis and maxillary antrum infections leading to septicæmia, in which a donor was inoculated with a vaccine obtained from the patient's discharges, and the immune blood transfused a few days or weeks later. All the patients were very ill, but three recovered.

6. *Hæmophilia Neonatorum*.—Lewisohn⁸ transfused blood for eight cases of this condition, and in each the bleeding promptly stopped.

Technique.—Quite a number of methods are in use. They fall into four groups: (1) *Direct transfusion*; (2) *Transfusion of unmodified blood*; (3) *Transfusion of citrated blood*; (4) *Transfusion of preserved red blood-corpuscles*.

1. My earliest attempts were with a *direct method* (after Fullerton). The radial artery of the donor and the basilic vein of the patient were dissected out under novocain anæsthesia, and a thin rubber tube about six inches long with a silver cannula at each end, sterilized and filmed by boiling in paraffin, was used to connect the artery with the vein. In the first two cases the result

was remarkable and satisfactory ; in two more cases no good was done, and I am sure very little blood passed.

The technique is somewhat difficult, and one can never be sure how much blood is given, which is a great drawback. When one finds how much force may be necessary to drive in the blood by other methods if the veins of the

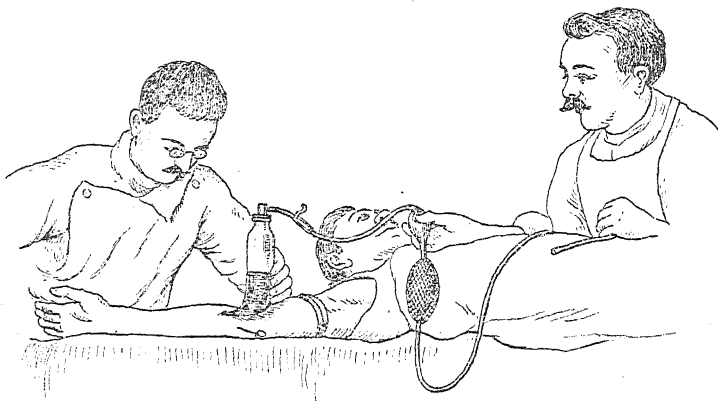


Fig. 2.—Jeanbrau's modification of Kimpton's method of blood transfusion ; collecting from the donor.



Fig. 3.—Jeanbrau's modification of Kimpton's method of blood transfusion ; transfusing into the patient.

patient are in a state of spasm, as they frequently are, one doubts very much whether any at all may be conveyed by the direct method in such cases. It is also difficult to know how long to let the blood flow ; twenty minutes is said to be a suitable time, or until the donor feels faint. The method ought to be abandoned.

Harrison⁹ describes a modification of the direct method whereby it is possible to measure the amount of blood given, but it differs little from the well-established Kimpton technique.

2. *Transfusion of Unmodified Blood.*—The procedures in general use falling under this heading are Kimpton's, Unger's, and Lindemann's.

In Kimpton's method, a glass cylinder holding about 500 c.c. is drawn out at the lower end to a cannula-point (*Fig. 1*). To the top end a pump is connected which can suck up the blood from the vein of the donor, and drive it into that of the patient. The illustrations (*Plate I* and *Figs. 1, 2* and *3*) are self-explanatory; they represent a French modification (Jeanbrau's). It will be observed that the bellows are reversed for the suction and the transfusion respectively, and that there is a little chamber at the top of the cylinder containing cotton-wool as a germ filter. The cylinder is sterilized and paraffin-filmed by boiling in water with a layer of paraffin on the surface; the cylinder is removed in the vertical position so as to coat its inner surface. In contact with a good film, blood remains unclotted for ten or fifteen minutes.

In Unger's method, a syringe with a four-way stop-cock is used, and the passages are kept flushed with saline to avoid clotting. It is not paraffin-filmed. An ether spray is directed on to the barrel of the record syringe to cool the blood below the temperature at which coagulation readily occurs (*Figs. 4-6*).

In Lindemann's method, one cannula is introduced into the donor's, and another into the patient's vein. By means of a 20 c.c. record syringe, blood is drawn from the one and injected into the other. Between each syringe-filling the cannulae are washed out with saline. Several syringes are needed, and they are lubricated with liquid paraffin. The method is simple, but one wonders whether the blood may not be disposed to clot *after* it has been transfused into the receiver.

It is difficult to say whether the use of unmodified blood is safer and more physiological than that in which coagulation has been prevented by citration. Accounts differ. Certainly there is greater risk of massive clotting, and therefore failure of the operation in spite of the donor's sacrifice, when no chemicals are used. The less expert the operator, the more likely is this to occur.

All these methods, also, require that the donor and recipient shall be brought together, which is not always desirable.

3. *Transfusion of Citrated Blood.*—Probably the best method is that worked out at my own casualty clearing station by Capt. Lindsay and myself, and improved on by Capt. O. H. Robertson (*Fig. 7*).

The bottle holds 20 to 30 ounces. I used to paraffin-film the inside by leaving a little paraffin (m.p. 42° C.) inside before autoclaving it, but this is not really necessary. Into the bottle is put 160 c.c. of 3.8 per cent solution of sodium citrate (isotonic). The tubes must be kept very clean, and the needles sharp and well oiled.

Procedure for Obtaining and Giving the Blood.—The donor lies down with the arm extended. The front of the elbow is iodined, a bandage applied to the upper arm, and the vein made to stand out by slapping the arm and directing the patient to make and unmake a fist. A little novocain is injected over the vein, the skin nicked with a scalpel (to keep needle sharp), and the needle introduced into the vein, point towards the hand. A little suction is made by the pump to keep a slight negative pressure in the bottle. If there is difficulty in finding the vein, it may be cut down upon under novocain and a cannula inserted.

The bottle stands in water at 100° F., and is well agitated in order to mix

BLOOD TRANSFUSION

(JEANBRAU'S MODIFICATION OF KIMPTON'S METHOD.)

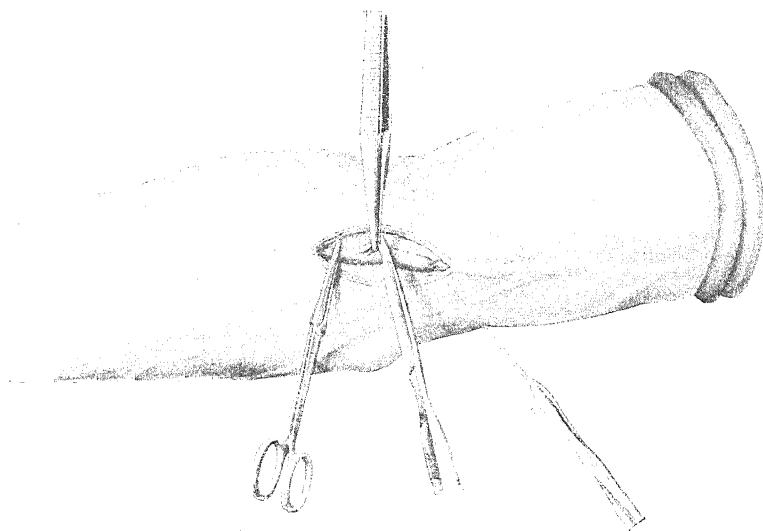


Fig. A.—Method of incising vein of donor to admit the point of the cylinder.

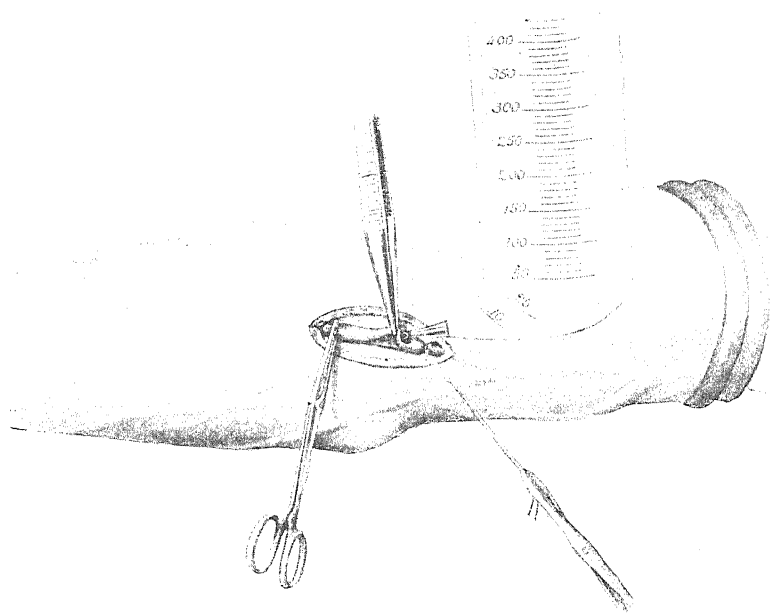


Fig. B.—The point of the cylinder gently inserted in the vein, in the direction of the distal portion.

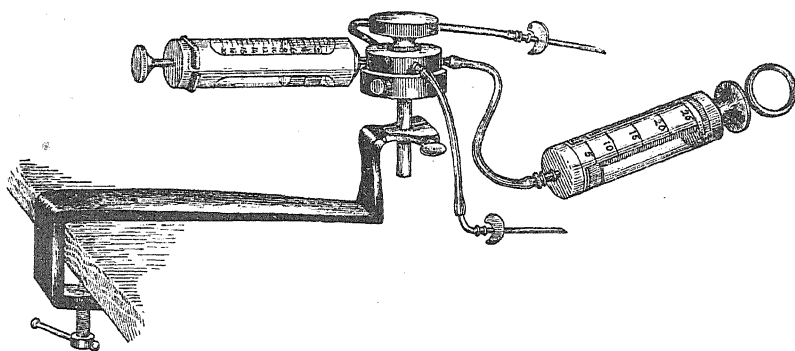


Fig. 4.—Unger's instrument for syringe transfusion : The recipient's cannula is seen above, the donor's below. On the left is a record syringe for aspirating and injecting blood ; on the left is the saline syringe. At any one moment saline solution is forced through that cannula through which blood is not passing. This automatic shunting is accomplished by the stopcock

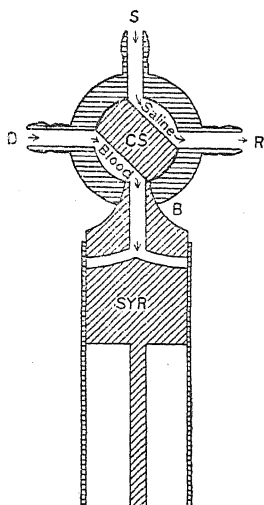


Fig. 5.—Blood transfusion (Unger). Donor's position : D, donor's outlet ; B, blood outlet ; SYR, blood syringe. Blood passes from donor's vein through D, and out at B into SYR. S, saline outlet ; R, recipient's outlet. Saline solution is forced from saline syringe through S, out at R into recipient's vein. C S, central stopper (rotates through an arc of 90 degrees).

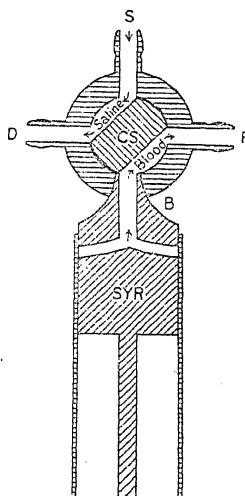


Fig. 6.—Recipient's position ; SYR, blood syringe ; B, blood outlet ; R, recipient's outlet. Blood is forced out of SYR through B, out at R, into recipient's vein. S, saline outlet ; D, donor's outlet. Saline solution is forced from saline syringe through S out at D into donor's vein. C S, central stopper.

in the citrate thoroughly with the blood. Take 20 ounces, more or less, as desired. The bottle is graduated. It is important to do the whole of the little operation as cleanly as possible. 'Dud' attempts to hit the vein lead to clotting in the vein, needle, and tube.

The bottle is now taken to the patient. A delay of half an hour, though undesirable, is not seriously harmful. The patient is prepared like the donor, but it is often necessary to cut down on the vein because of the troublesome vein-spasm. Take care not to inject air. The bottle is prepared with two needles, so that if one blocks the other may be available. Considerable pressure is often needed to force in the blood, and the stopper of the bottle may 'jump.' If the vein is too contracted to admit blood, I usually cut down on the internal saphena at the groin. If the blood is given too fast the patient may complain of a sense of bursting in the chest, or all over; this soon passes

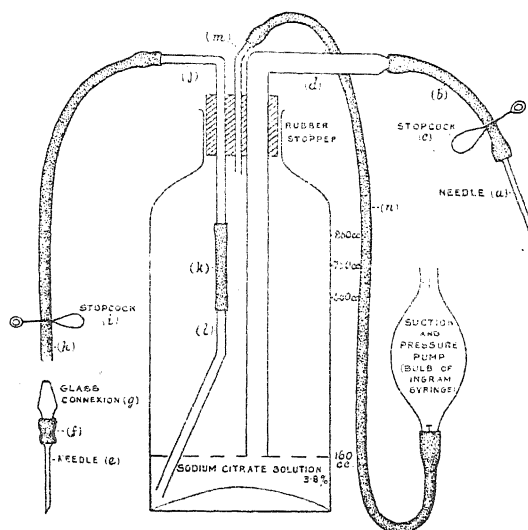


Fig. 7.—Robertson's transfusion apparatus.

if he breathes deeply and the flow is checked for a minute or two. It takes ten to fifteen minutes to inject a pint of blood.

Some observers have been very unnecessarily concerned as to the toxicity of sodium citrate. I have several times given much larger quantities than the 6 grms. put into the bottle, without any harm resulting. Hedon¹⁰ finds that 4 grms. is a safe dose for a dog. If one thought symptoms were due to the citrate, calcium chloride could be transfused. Nor is there any fear that the patient's blood will be rendered less coagulable. We found no change in the coagulation time after citrated-blood transfusions; Hedon and others find that the coagulation time is reduced.

4. *Transfusion of Preserved Red Blood-cells.*—It has been shown by Abel that a big hæmorrhage can be replaced just as efficiently by red blood-corpuscles suspended in Locke's fluid as by fresh whole blood. Plasma, of course, cannot be kept without undergoing changes which would render it toxic. Rous and Turner have shown that red blood-corpuscles kept in a citrate-dextrose solu-

tion may be stored for several weeks, and will still function if injected into an animal of the same species after a hæmorrhage. If they are kept too long (three weeks in the rabbit, over four weeks in man), they do no harm, but are rapidly removed, so that the hæmoglobin and red-cell counts, which had been brought up to normal by the transfusion, rapidly fall again. Capt. O. H. Robertson¹¹ was sent to the casualty clearing station where I was stationed, just before a big battle, to apply these results to man. Forty pints of blood (including a pint from a well-known consulting surgeon) were taken and stored in ice, in a citrate-dextrose solution. It takes about a week for the corpuscles to settle; the supernatant plasma is then decanted off. Fuller details are given in Robertson's paper. It is essentially a war procedure, and is not likely to find a place in civil surgery; but I can quite bear out his claim that the results are apparently just as harmless and just as life-saving as fresh blood transfusion. Of 20 cases, 11 were sent down to the base recovered.

Risks and Reactions.—The risk to the *donor* is trifling. We usually kept donors in bed for a day or two after taking a pint of blood from them, but they showed no symptoms whatever. The consulting surgeon who gave a pint went on a long motor drive just after, and said that he felt as if he had played a hard football match. The only case in which I have seen harm to the donor was a patient sent under my care who had had blood taken elsewhere, and the internal cutaneous nerve was included in a ligature (verified by operation). He got a troublesome reflex neurosis of the hand and arm. I am told that in America there are professional donors who allow themselves to be bled every three or four weeks at so much a time.

The risk to the *receiver* is slight if the two bloods are compatible, but there is a 30 per cent risk of hæmolysis if they are not tested, and in 5 to 10 per cent the reaction may be alarming or fatal. Syphilis has been conveyed; I have been told of such cases by eye-witnesses, but have not seen it myself. This risk could be excluded by taking a Wassermann. Probably malaria also might be transmitted.

If hæmolysis occurs as a result of the injection of an incompatible blood, symptoms usually appear during the transfusion. They are vomiting, dyspnoea, an urticarial rash, quick weak pulse, and perhaps convulsions or coma. Vomiting by itself is not necessarily a danger sign, and a sense of oppression in the chest may be due to too quick transfusion, not hæmolysis. After the injection, hæmoglobinuria may occur, and a few deaths are reported. If the transfusion is immediately stopped, serious trouble may be averted.

Even when the blood of a donor of the proper group is used there is a small risk (2 in over 200 cases, Kimpton).

Apart from severe symptoms due to hæmolysis, milder signs of a toxic effect are not uncommon. Meleney, Stearns, Fortune, and Ferry¹² report a study of reactions in 280 cases of blood transfusion at Philadelphia. A slight rigor sometimes occurs half an hour afterwards, or an urticarial rash (I have never seen either in about 30 cases). Some fever is common; in 63 per cent it is 100° or over. It only lasts a few hours in ordinary. A symptomless polymorphonuclear leucocytosis is often met with. Large transfusions (over 200 c.c.) are more apt to produce reactions than small ones. Second or third transfusions give rise to rather more reactions than the first. The method used was generally an injection of citrated blood; the others were mostly given with the Lindemann syringe-cannula.

Group-testing.—Strange to say, the bloods of different individuals, even of the same family, are not always compatible. Shortly after birth the blood takes up the characters of one of four groups, and these apparently persist throughout life unchanged. The blood of a patient of a particular

group may be given safely to another person of that group, but not necessarily a person belonging to another group. The incompatibility lies in two directions: One blood will (a) agglutinate and (b) hæmolyze that of a patient of another group. It seems to be established that a blood which hæmolyzes another will also agglutinate it; this is convenient, because it is simpler to test out the agglutination reaction than the hæmolysis.

According to Moss,¹³ there are four classes of bloods, designated as Groups I, II, III, and IV. The relative proportion of these groups (in America), and their suitability as donors, are given in the following table:—

Donor	Percentage frequency	Suitable if patient belongs to
Group I ..	5	Group I.
" II ..	40	" I, II.
" III.	10	" I, III.
" IV	45	" I, II, III or IV.

When the blood of a Group IV donor is given to a Group I, II, or III patient, the plasma of the donor has a tendency to hæmolyze and agglutinate the corpuscles of the patient; but the plasma of the patient does not so act on the corpuscles of the donor, and it is found in practice that what matters is the effect of the patient's plasma on the donor's corpuscles, not the reverse. This is no doubt because the bulk of the patient's own blood is much greater than that of the transfused blood.

The easiest method of determining the blood-group of a donor is Vincent's¹⁴ (*Plate II*). It is necessary to obtain and to keep in stock the serum of a Group II, and also that of a Group III. This is obtained by collecting 20 c.c. of blood under aseptic conditions and allowing it to clot and the serum to separate out. Sodium citrate is added to make a 1.5 per cent citrated serum, and 0.25 tricesol as a preservative. It is then put up in capillary tubes and will keep for months or years.

To make the test, a glass slide is taken, and a drop of Group II serum put near one end and a drop of Group III serum at the other. The would-be donor's ear is pricked, and with a couple of match-sticks a very little blood is mixed into each of the serum-drops. The result may be as follows:—

Blood-corpuscles agglutinated by	Donor is
Group II serum and Group III serum ..	Group I
" III " but not Group II serum ..	" II
" II " " " III ..	" III
Neither serum " " ..	" IV.

The agglutination is quite obvious to the naked eye in about five minutes.

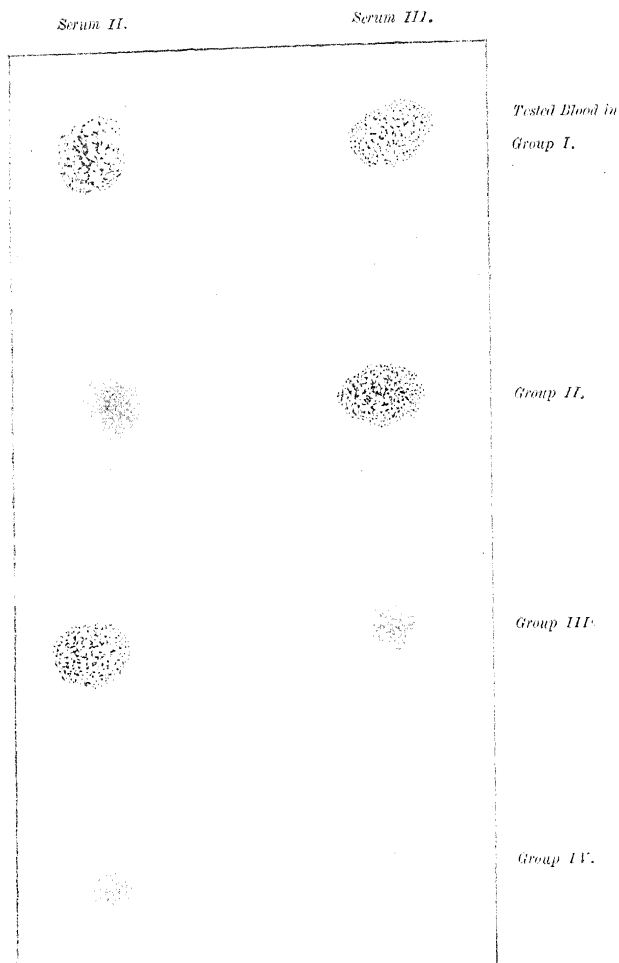
In choosing donors, one may either use one belonging to the same group as the patient, or a Group IV donor. Group IV individuals are the universal providers. Thus, if a Group IV donor is available, it is not necessary to know what group the patient belongs to. On the other hand, if the patient and the donor both belong to Group II, the bloods will be compatible.

Sanford¹⁵ suggests the use of dry serum films on slides, and offers to provide

PLATE II.

BLOOD TRANSFUSION

VINCENT'S METHOD OF GROUPING DONORS' AND PATIENTS' BLOOD.



Reprinted from the 'Journal of the American Medical Association.'

slides with a Group II serum at one end and a Group III at the other. (From the Mayo clinic, Rochester, Minnesota.)

If one has not the two group sera in stock, it is necessary to test the patient's serum against the donor's corpuscles directly. Draw off a few c.c. of blood from the patient, and allow to clot in a tube. Obtain a *large* drop of quite clear patient's serum, and add a trace of citrate solution. Mix in a *very little* of the donor's blood. If agglutination occurs in five minutes, the donor is not suitable; if there is no agglutination, the donor's blood may be used for transfusion.

LITERATURE.—A good catalogue of the pre-1918 literature is given by Bruce Robertson. The principal papers of the past year are as follows:—

- ¹O. H. ROBERTSON, *Brit. Med. Jour.* 1918, i, 477.
- ²BRUCE ROBERTSON and WATSON, *Ibid.* 1917, ii, 679; *Ann. Surg.* 1918, 1 *Lancet*, 1918, i, 759.
- ³MURARD, *Lyon Chir.* 1918, Jan.-Feb., 147.
- ⁴UNGER, *Jour. Amer. Med. Assoc.* 1917, ii, 2159.
- ⁵KIMPTON, *Boston Med. and Surg. Jour.* 1918, i, 351.
- ⁶KERLEY, *Arch. Pediat.* 1917, Jan.
- ⁷HOOKE, *Ann. Surg.* 1917, Nov., 513.
- ⁸LEWISOHN, *Amer. Jour. Obst.* 1918, June, 933.
- ⁹HARRISON, *Lancet*, 1918, ii, 455.
- ¹⁰HEDON, *Presse Méd.* 1918, Feb. 4, 57.
- ¹¹O. H. ROBERTSON, *Brit. Med. Jour.* 1918, i, 691.
- ¹²MELENEY, STEARNS, FORTUNE, and FERRY, *Amer. Jour. Med. Sci.* 1917, ii, 733.
- ¹³MOSS, *Med. Bull.* 1918, May, 516.
- ¹⁴VINCENT, *Jour. Amer. Med. Assoc.* 1918, i, 1219.
- ¹⁵SANFORD, *Ibid.* 1221.
- ¹⁶STANSFELD, *Lancet*, 1918, i, 334.
- ¹⁷KARSNER, *Jour. Amer. Med. Assoc.* 1918, i, 769.
- ¹⁸GUIOU, *Brit. Med. Jour.* 1918, i, 695.
- ¹⁹ZINGHER, *Med. Rec.*, 1918, July 13, 64.
- ²⁰ROSENTHAL, *Bull. Acad. de Méd.* 1917, lxxvii, 10.
- ²¹HULL, *Brit. Med. Jour.* 1917, ii, 683.
- ²²LEE, *Ibid.* 684.
- ²³GRATIA, *Arch. méd. Belges*, 1917, Nov., 1029.

RADIO-ACTIVITY AND ELECTROTHERAPEUTICS.

BY

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THE impetus of the War; the establishment of large military orthopaedic hospitals, embracing cases so apparently widely separated as bone and nerve injuries; the urgency of the requirements of the Ministry of Pensions for the after-treatment of pensioners; have all combined to force on hospital authorities—military and civilian—the necessity of organizing departments equipped for providing for a large and increasing number of cases, facilities for massage, hydrotherapy, mechanical exercises, and electrotherapeutic treatment. In most military hospitals these departments are separate, with separate officers and staffs, and a patient will, at the order of a physician or surgeon, attend one or more of these departments, in each of which the special treatment will be regulated by the expert at its head.

The Alder Hey Military Orthopaedic Hospital, Liverpool, may be taken as an example of the best of these centres. In the main hospital building is a large ward for massage alone, in the charge of a trained massage sister, and superintended by a medical officer, an expert in massage work. In a separate building is a large gymnasium fitted with various types of gymnastic and mechanical apparatus. An instructor supervises the work here, and it is controlled by the same medical officer. A third building houses on the one side an elaborate system of whirlpool baths, etc., and on the other an electrotherapeutic room, each under its own medical officer. Further, in still another building, with a third medical officer, are workshops in which convalescent soldiers are put to splint-making, carpentering, boot-making, and other kinds of work designed and considered as suitable treatment for the cure or amelioration of the exact disability from which each case is suffering.

This is the general scheme; and it is to be noted that any patient, in addition to the medical officer originally in charge of him, may come under from one to three other officers, each responsible for his own field of treatment, and each to a large extent working with his own staff of nurses and assistants.

ELECTROTHERAPEUTICS.

As a guide to what is now being done, the first part of this section will consist of short descriptions of the new departments at Alder Hey and at the Liverpool Royal Infirmary, especially from the points of view of their organization and equipment.

At Alder Hey, in one large room arrangements are made for ionic medication, interrupted galvanism, diathermy, Bristowe, sinusoidal, and radiant-heat treatment. The electric supply and the wiring make interesting features. The first consists of a 230-volt d.c. made on the premises; this was found unsuitable for direct use owing to the great fluctuations due to the running of the lifts and to other hospital requirements. The officer in charge—Captain Alexander—decided therefore to use a current from accumulators, and

installed a set of accumulators to give a steady 100-volt continuous current. These give an absolutely steady current for the purposes of ionization and interrupted galvanism, and only require charging up for from four to six hours once a week.

The wiring and fittings have been so arranged that there are no batteries, dry cells, or metronome interrupters in the room, and, as far as possible, everything has been made fool-proof. There are five separate circuits running round the whole wall-space at a height of about 5 ft. from the floor: (1) A 100-volt d.c. (2) A 100-volt d.c. for interrupted galvanism. In the switchboard room, on this circuit, is a dipper mercury interrupter energized by a small motor, capable of interrupting the current automatically from 40 to 70 times per minute. All metronomes are thus done away with, and the rate of interruptions is put out of the control of individual nurses. (3) A 180-volt a.c., generated by means of a rotary converter from the 230-volt d.c. (4) A 110-volt a.c., for diathermy only, generated in a similar manner by a second converter. (5) A 4-volt d.c. supplied from a small set of accumulators for the Bristow coils, separate from the main set. (6) In addition, in one corner of the room is a main 230-volt d.c. circuit for the radiant-heat apparatus. At frequent intervals round the room plugs are fixed on each circuit; these cannot be interchanged, and it is impossible for a nurse to connect any piece of apparatus to a wrong circuit. The wiring has been extended in various places under the flooring, and direct connection can be made by plugs in the floor for any apparatus to work on any table in the middle of the room.

Liverpool Royal Infirmary. At the request of the Local Pensions Committee, the managers have established a department constituted in the main for the efficient after-treatment of disabled pensioners, while meeting also the requirements of a large general civilian hospital. It was decided that the new department should be called an 'orthopædic department,' and that a special feature should be made of the treatment of the out-patient fracture cases. Through the generosity of the committee of management and of some of its members, ample space and funds were placed at the disposal of the organizers.

It was decided that everything should be under the same roof and the same staff. Mr. Thurstan Holland was made the head of the department, to organize, equip, and exercise general control, whilst Mr. Kennon undertook the control of the work and the responsibility of carrying out the treatment of the cases. Further, since it was intended that the new venture should eventually lead to the establishment of a complete orthopædic department of which this should be an adjunct, Sir Robert Jones, C.B., was asked to accept, and has accepted, the post of Honorary Consulting Orthopædic Surgeon to the Infirmary.

The nursing staff consists of a trained sister—trained in massage and electrical treatment,—a staff sister, six Almeric Paget nurses, and ten pupils.

The two main principles which have been held in view are: (1) To combine all the allied treatments under one medical control, with one staff to carry them out; (2) To introduce a system which, whilst dealing with the various cases—pensioners and otherwise—requiring massage, hydrotherapy, remedial exercises, and electrotherapeutic measures, should at the same time undertake, and be available for the treatment, *ab initio*, of, ambulatory (out-patient) fractures, sprains, and such-like injuries.

It will be of interest to state the three regulations under which cases are dealt with.

1. Cases referred by an Honorary Medical or Surgical Officer are received in one of two ways: (a) They can be sent with a general request for treatment.

In such a case the departmental staff take over the case entirely, prescribe and direct the treatment, and only refer again to the Honorary at their own discretion; (b) An Honorary can prescribe the treatment and continue the charge of the case. In this event the department undertakes no other responsibility beyond the carrying out of the prescribed treatment.

2. If cases are referred by House Surgeons, Casualty Officers, etc. (these will of course be from the out-patient or casualty departments of the hospital), then the staff take over the entire control of the case and deal with it in any way considered proper.

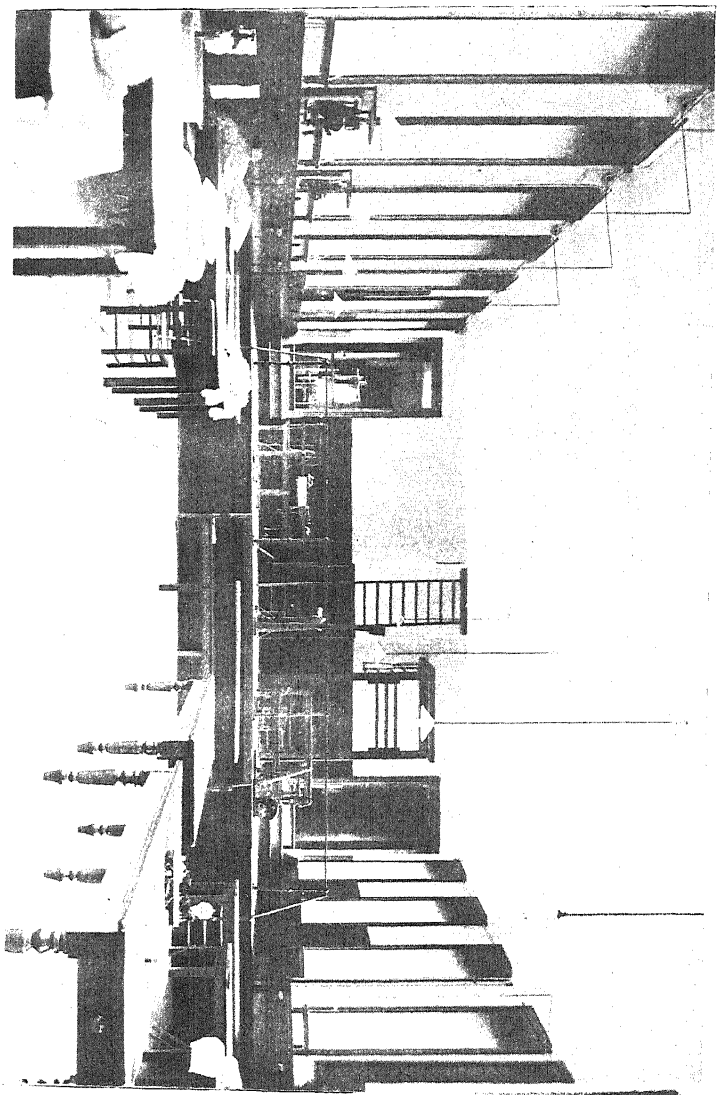
The department is situated on the ground floor of the hospital, close to the lifts and to the main staircase, and is opposite the x-ray department. This is an ideal situation both as regards out-patients and in-patients, and is convenient for the staff. On the right, entering the department, is one room fitted up with high-frequency apparatus and a diathermy outfit; it is also available for sinusoidal treatment and for ultra-violet radiations. Next to this is a consulting-room for muscle and nerve testing, provided with a dry-cell galvanic and a small faradic battery, and a Hernaman-Johnson condenser. On the opposite side is a splint and plaster room. Outside this part of the establishment is a large waiting-room, which leads directly into the main treatment-room. This room is 70 ft. by 30 ft., very lofty, and well lighted (*Plate III*). To the left on entering is an office, where the sister in charge keeps the records, case-books, and cards. A 220-volt direct current is supplied, and the room is wired in its whole length on each side. At convenient intervals are six double switches for the attachment of galvanic switchboards (fixed to the walls) for continuous or metronome-interrupted currents, and for the attachment of movable Bristow coils. The room will accommodate twenty to thirty massage tables, leaving ample space between the tables and down its centre. At the further end is a space 21 ft. by 30 ft., raised 3 ft. above the main floor, and supplied with mechanical apparatus of various kinds for both passive and active treatment of muscles and joints. Behind this raised portion, and opening from it on either side, is another room, 28 ft. by 30 ft., in which are arm and leg baths—hot and cold,—Schnee baths, and arm and leg whirlpool baths supplied with compressed air from a motor. Opening from this the department is completed by two large lavatories, which include baths for total immersion.

Work is arranged for the mornings, afternoons, and evenings—the latter being important from the point of view of the pensioners. Each patient comes at a definite time which is entered on the attendance card. At the first visit the case is seen by the medical officer, the treatment prescribed, and it is then allocated to one of the trained nurses. The latter is made responsible for carrying out the entire treatment of the case right through, and either herself completes the whole course or superintends its being done by one of the pupils. The same patient is always seen by the same nurse, and it is one of the nurse's duties to keep a careful record of the treatments and of the progress of the case, and to make sure that the medical officer sees the patient every few weeks. By this system it is easy to arrange that, according to the demands, males and females attend at different hours.

The general organization has been such that the department is capable of expansion both as regards the number of cases to be dealt with, and the addition of apparatus of all kinds; there would be no difficulty in giving 300 treatments daily if required. The routine aimed at provides that time sheets are used, and, attending at fixed times, no patient is kept waiting, whilst, as the same nurse takes the case through all the different treatments ordered, he goes straight on from one to the other without any pause, and—a point

MAIN ROOM OF THE NEW ORTHOPÆDIC DEPARTMENT, LIVERPOOL ROYAL INFIRMARY

PLATE III.



again to be emphasized—there is no handing over of the case from one department, or nurse, to another.

Diathermy.—Cumberbatch¹ gives a useful description of the physics, apparatus, and construction of the diathermy apparatus. In comparing different electric currents, he points out that with most of them the disagreeable and painful sensation caused by the stimulation of the tissues makes it impossible to use sufficient current to utilize the heating effect. It is only by increasing the frequency of the alternating current that this loses the power to stimulate the tissues whatever its strength and density. There is a critical point of oscillation; and for the human subject, if the current oscillates more frequently than 100,000 times per second, the stimulating power is lost, and the strength may be increased till the heat produced is too great to be borne. The author concludes with the method of application of the diathermy current to the body, the medical and surgical uses of diathermy, and a brief historical note. McKenzie² points out that nowhere is the distressing pain of **Cancer** worse than when it attacks the pharynx, and that the remedy of choice for the relief of the patient is diathermy. A brief outline of the nature of the current and its application to growths of the pharynx follows. In *operable* cases it possesses advantages over the knife, inasmuch as the growth can be removed more certainly and the resulting wound heals more rapidly and with less pain. In *inoperable* cases, in which ordinary surgery only makes matters worse, diathermy has proved of the greatest value. Painless swallowing is restored, weight is put on, life is prolonged in comparative comfort. Certain precautions are necessary; and care must be taken as to the length of the sitting, the position of the indifferent electrode, and as to the possibility of secondary hæmorrhage. The limitations as regards cure are indicated; and the author concludes that it is when dealing with a so-called **Inoperable Cancer of the Pharynx** that it is possible to realize and appreciate the value of this merciful agent of treatment.

In a comprehensive paper, Burke³ discusses the "Treatment of cases with **Injury to Peripheral Nerves**," and following this paper is the report of the discussion on the various points raised. He deals with the general question of electrical treatment, including diathermy, and also with massage, exercises, etc., and emphasizes the necessity of co-operation and co-ordination between the different specialists. The wide range of the paper and discussion, and the diverse views expressed, cannot be summarized in such a manner as to be of value, and those interested should refer to the original communication.

The treatment of the wounded by means of electricity, with special reference to the **Nervous System**, is further dealt with by Seeuwen,⁴ who uses chiefly whirlpool baths, massage, and ionization, separately or alternately, to loosen scar tissues, and electricity to the muscles. He makes an interesting point as regards the galvanic current, inasmuch as his results have been far better with a galvanic battery of thirty-five to forty cells and a voltage of 40, than when he used a multostat energated by the 220-volt main. With the latter 10 to 15 ma. was painful and could seldom be exceeded; with the battery, on the contrary, it was possible to start at once with 10 to 15, and often, after a few applications, to increase to 30 or more without any complaint from the patient.

Galvanic Current.—Hernaman-Johnson⁵ contributes a paper on the treatment by cerebral galvanism of **Children Mentally Backward** as a result of prolonged illness: His first case was that of a child who had become backward at school and subject to fits, following an attack of whooping-cough. After twenty treatments he was restored to a normal condition. A further case confirmed the author in his opinion that the cure was the direct result of the

treatment. Great stress is laid upon the technique. This should be carried out by means of a dry-cell battery with a finely-graduated resistance. One pad, 3 in. by 2 in., is bound on the centre of the forehead; the other, slightly larger, is fixed to the back of the neck. A current of from 1 to 3 ma. is passed for twenty minutes, and great care must be taken that the current passes in a strictly antero-posterior direction, and that on no account should this be passed in a lateral direction through the brain.

The use of the *surging galvanic current* in the treatment of **Paralysis** is strongly advocated by Cumberbatch,⁸ who points out that if the current is applied, not with sudden rise to full strength and equally abrupt fall to zero in the customary way, but with a more gradual increase of strength to maximum and an equally slow fall to zero, and if at the same time it is made to flow longitudinally through the muscles always in the direction of the fibres, contractions will be produced only in the paralyzed muscles with R.D., and not in the healthy muscles. Therefore contraction of the paralyzed group and stretching of the healthy antagonists are obtained. A full description of the technique is detailed; the apparatus is simple, and a water rheostat serves admirably. The principle of the water rheostat is described. The method has an advantage inasmuch as in a large proportion of the cases, especially those fairly recent, the limbs can be immersed in water without the labour of applying electrodes or fixing supports to them.

Turrell⁷ writes on the selective treatment of paralyzed muscles. He uses an apparatus made for him, consisting of a water resistance from which the wires lead to a reversing metronome and thence to the patient. A box containing fifteen condensers of two microfarads each, arranged in series and fitted with a selector and studs, so that capacities from 2 to 30 mf. can be used as desired, is inserted in parallel between the metronome and the patient. This is an application of Lapicque's ingenious method, which is described; and the opinion is expressed that the advantages of the use of the condensers is very marked, and that the method is one deserving an extended trial, as, both theoretically and practically, it appears to remove the objections raised against the use of the interrupted galvanic current in peripheral nerve lesions and in infantile paralysis.

Nerve Testing during Operation.—Rowley Bristow's⁸ brief account of the methods he uses in a military hospital includes the report of an illustrative case, the apparatus required, and the manner of its application. A weak, metronome-interrupted faradic current is used, and after the nerve has been isolated a glass rod is passed beneath it. A normal nerve will be stimulated by a weak current, the muscles contracting with each beat of the metronome. As illustrating its uses it is stated that on stimulating, say, an exposed median nerve, the muscles put into action vary according to the exact part of the circumference of the nerve which is stimulated. As the testing takes only one or two minutes, it can be easily carried out in the course of an operation.

Ionic Medication.—In **Ear** conditions of various kinds, Kesteven⁹ has found this treatment most effectual, and he does not consider that the results can be obtained by simple electrolysis. His technique involves placing the patient's head sideways upon a table, filling the meatus with the solution to be employed, passing the current through this, and so ensuring a constant supply of the required ions. A small probe insulated to its tip will convey the current into the solution. Illustrative cases are recorded. In the acute pain of **Middle-ear Catarrh** he has noticed marked relief, and he considers that early mastoid cases can be arrested. In a man stone deaf for twenty years with middle-ear disease and fixed ossicles, after six months' treatment improve-

ment was brought about to such an extent that the patient could hear loud conversation.

Hickling¹⁰ relates the case of a nurse with **Multiple Neurofibromata of the Spinal Cord** associated with great pain and stiffness of the back. Some of the small tumours were removed surgically from the spinal nerve roots without any relief, and finally work had to be given up. After a six weeks' course of *salicylic ionization*, improvement took place to such a degree that massage work could be resumed, and now two applications weekly suffice to keep the trouble at bay. From being a hopeless invalid this patient was turned into a useful member of the community.

Faradic Current.—Levick¹¹ treated **Trench Foot** with radiant heat, and found it only aggravated the condition. After soaking the feet in a 110° bath for fifteen minutes the water was run off until only the soles of the feet were covered as they rested on the bottom of the bath. The active carbon-plate electrode of a faradic circuit was immersed in the water in front of the toes, the indifferent electrode being connected to a piece of wet lint encircling the ankle. A metronome was placed in the circuit making fifty interruptions to the minute, and the current gradually introduced. This treatment gave very satisfactory results.

Ultra-violet Rays.—Dieffenbach¹² has found that practically all forms of **Alopecia** respond to ultra-violet irradiation from a quartz lamp, using 3½ amps., on a 220 d.c., the distance of the lamp to the skin being 10 in., and the initial exposure 15 minutes in the case of blondes and from 20 to 25 minutes in that of brunettes and grey persons. A given area is treated once a week, the eyes and other exposed parts being suitably protected. In early cases one treatment may be sufficient, in others as many as twelve exposures may be necessary. A superficial hyperæmia appears in from one to twelve hours, and no effect on the brain or membranes need be feared.

A leading article in the *Journal of the American Medical Association*¹³ discusses the toxicity of ultra-violet rays, and deals with the researches and opinions of various authors. There is no doubt that the rays are generally highly toxic even for colourless organisms, and this toxicity apparently depends upon a photo-chemical reaction. Various considerations suggest that the proteins are participants in this phenomenon, and the possibility is indicated that the tyrosin and phenylalanin radicles of the protein constitute the optical sensitizers which render the cells susceptible to the toxic action.

REFERENCES.—¹*Jour. Inst. Elect. Eng.* 1918, June, 349; ²*Med. Press and Circ.* 1918, May, 337; ³*Arch. Rad. and Elect.* 1918, July, 34; ⁴*Ibid.* 1918, June, 5; ⁵*Lancet*, 1918, i, 903; ⁶*Ibid.* 1917, ii, 570; ⁷*Ibid.* 1918, i, 904; ⁸*Brit. Med. Jour.* 1918, i, 6; ⁹*Ibid.* 1917, ii, 423; ¹⁰*Ibid.* 1916, ii, 514; ¹¹*Ibid.* 1918, i, 370; ¹²*Prescriber*, 1918, July, 120; *Amer. Jour. Electroth.* 1917, Sept.; ¹³*Jour. Amer. Med. Assoc.* 1917, ii, 1433.

RADIOLOGY.

Localization of Foreign Bodies, and War Radiography.—Papers on this subject still continue to appear in constant succession in the journals, and especially in those restricted to *x*-ray and allied work. No strictly speaking original methods have been evolved, but considerable ingenuity has been displayed in perfecting, and improving the results of, the older procedures.

Case¹ publishes a "Brief History of the Development of Foreign Body Localization by Means of the *x* Rays," which is valuable from its extensive bibliography. All modern workers would do well to make a careful study of this communication, which demonstrates in a remarkable manner that most—if not all—of the work on this subject which has been done since the War began is very far from being original. It is pointed out, for instance, that Mackenzie Davidson and Hedley described the triangulation method in 1897,

and on this are based all the present-day methods which have this as a fundamental principle. In the same year Levy-Dorn described the principles of the parallax method. Rémy and Contremoulins evolved an elaborate piece of apparatus which was the forerunner of the Hirtz compass and most of the other directors. An illustrated paper by Rémy—not included in the bibliography—can be found in the *Archives of the Röntgen Ray*, August, 1900, p. 13, in which the illustrations clearly show the use of metal directors pointing to the site of the foreign body. Walsh, again, in 1897, visualized the skin adjacent to foreign bodies by means of a bismuth paste. It is hardly too much to say that in 1897 and 1898 every principle involved was fully described, and that nothing has since appeared except descriptions of bits of apparatus, and methods of working, devised by the various authors with the idea of facilitating this line of *x*-ray work.

Another paper which should be read and studied is one by Knox,² who discusses localization, not as a separate consideration, but as intimately connected with the procedures to be adopted for the successful removal of a foreign body after its radiographic demonstration. He makes a strong point of the necessity of standardization, not only from the view-point of the mere method of localization, but also from that of standardizing the apparatus by means of which the necessary evidence is obtained. He also insists that mere depth and skin marking is not enough, but that an endeavour should be made to give the surgeon a mental picture of the exact location of the foreign body in its relationship to the anatomical landmarks in its vicinity. The vexed question of operating under direct *x*-ray control is also very fully discussed, and it is shown that although the requirements of war surgery have emphasized the value of this method, it is nevertheless quite old, and has been used by some workers for many years back.

Holland,³ in describing his experience of two years in a home base hospital, gives a detailed description of the principles of localization from below up on the screen which he has used as a routine during the whole time, and points out the class of cases in which other aids to the surgeon have been found necessary. The technique adopted, and the simplicity of the apparatus used, are such that in the vast majority of cases a well-trained sister or orderly can be relied upon to carry out the purely technical radiographic work. This paper is illustrated by diagrams and radiographs to demonstrate the method.

Working on similar lines, Cole⁴ and Hall-Edwards⁵ have designed pieces of apparatus with a view to assisting a surgeon at the operation, and it is remarkable that both the principles of the apparatus, and the apparatus itself, are practically identical. Essentially, each has a base-board on which the part of the body to be operated upon is fixed, and similar steps are taken to reproduce the radiological position; each has a metal upright at one side carrying one or more movable metal pointers designed to point from one or more directions straight towards the position of the foreign body; in each these metal pointers can be removed and replaced during the steps of an operation. Both instruments should have a distinct use, especially when the foreign body is situated in some part of a limb.

Mackenzie Davidson's⁶ new localizing couch is based on the principle of localizing on the screen, or on plates, from below up, and is so designed that the tube, contained in a very large box beneath the table, and the screen and plate holder fixed above the table to the same arm which carries the tube below, work in unison. That is, tube and screen are fixed at a distance of 50 cms., and move up and down together at this fixed distance. The usual triangulation method is used, but this constant anode to screen distance makes it possible to read off on a scale the depth of a foreign body without

any mathematical calculations, etc. A further feature of this couch is the diaphragm over the tube. By means of an ingenious arrangement of the lead plates and handles, it is possible to see on the screen each position of the foreign-body shadow in a small square of illumination. This is a great advantage, especially when the foreign body is a small one casting a faint shadow. The large tube-box is also an advantage, as it makes efficient protection easy, and it also facilitates access to the tube. For rapidity and accuracy of skin marking, and for reading off the depth of a foreign body, this new couch is admirably constructed.

The *Baese Localizer* described by Bergonié¹ has the same principle of a fixed distance from tube to screen, but that of measurement of depth differs. This apparatus consists essentially of an upright stand carrying a tube below and a screen above, and can be used with any kind of table. It is very mobile, and is complete in itself, no other apparatus except the x -ray generating outfit and a couch for the patient being required. The tube and screen are fixed at the extremities of a diameter, and can be made to describe equal and opposite arcs about the centre of the circle traced by the rotation of the diameter. The normal x ray traverses this central point, and the shadow of any foreign body situated at this central point will remain fixed on rotating the arm carrying the tube and screen. This immobility of the shadow is the criterion and fundamental principle of Baese's method. By means of a graduated pointer the depth can be read off instantly, and the rapidity of work is such that a few seconds only are required to place the apparatus in the position to make the observations. A full illustrated description of this exceedingly ingenious piece of apparatus, which is used extensively in the Italian Army, is given in this paper.

The plate method used by Shenton² is useful and simple, inasmuch as no special apparatus is required, and no calculations of any kind are necessary. Two plates are placed one above the other, the distance between them being anything from 5 to 10 cms.; these are placed with their films downwards on the part under examination. The tube distance is immaterial. A double exposure is made—the tube-shift need not be measured. Double images of the foreign-body shadow appear on each plate, those on the uppermost plate being farther apart than those on the lower. Then, on a piece of paper, two lines are drawn at right angles to one of its edges, and on these lines the respective distances of the shadow-shift are measured off; finally, a line joining them is continued to the edge of the paper. The depth of the foreign body will be the length of the distance of the latter point to the lower line measured along the edge of the paper. To correct any error which may be due to the lower plate not being in actual contact with the skin, a metal marker is placed upon the skin, and this will throw double images on the plates; this can be localized in exactly the same manner to give its distance from the skin to the plate, and a correction is made accordingly.

Eastman and Bettman,³ in relating their experiences in a war hospital in Vienna, write on the subject of x rays in war surgery and their relation to the removal of foreign bodies, and strongly advocate the use of the screen. The paper throughout indicates a very superficial knowledge of really expert radiography, and should be read as an example of how not to do it rather than the opposite. Much stress is laid on x -ray points and x -ray findings which may be described as ancient history, but which are emphasized as if they were of recent (Austrian) discovery. It is interesting to note that it is stated that most of the hospitals in Vienna have attempted to substitute paper negatives for glass plates, but the exposures are longer, and intensifying screens must be used; and to compare this statement with the fact

that in England paper negatives are quite as fast as glass ones and require no intensifying screens.

Shearer¹⁰ contributes a long paper on the standard methods for localization approved by the Surgeon-General's Office, U.S. Army. The two-wire, double-tube-shift method; the parallax method; the tube-shift with mechanical triangulation; the Hirtz compass; the cannula and trochar with harpoon,—have all been approved and adopted after a conference with Case, who directs the x-ray work in France. A short description of their application and the technique of each is given, with illustrative diagrams, etc. It is pointed out that in evacuation hospitals dependence must of necessity be placed upon fluoroscopic work, and that consequently all arrangements in hospitals near the front must conform to the conditions imposed by fluoroscopy. A concise description of operating under screen observation is given. The author concludes by pointing out that surgeons and röntgenologists must be prepared to work together, each recognizing the limitations of his own speciality and the legitimate field of the other. He advises that, without aiming at becoming an expert, it is desirable that all operating surgeons should attend a considerable number of x-ray examinations, and that all röntgenologists should be allowed to attend operations; and that only in this way will a better realization of the specific difficulties which beset the work of each specialist be mutually appreciated. Bowen's¹¹ paper should also be studied. He gives an interesting and concise account amongst other things of the technique of using Sutton's instruments, and the use of the Hirtz compass. This paper is well illustrated. The suggestions as to the manner of furnishing reports to the surgeons, on that of skin markings, and for the reproduction of positions of limbs, etc., are simple and practical. A fault of this paper is that the author attributes certain methods to certain workers who have already disclaimed any priority. Taken together, these two articles of Shearer and Bowen should be read by all radiologists and surgeons who are engaged in War work either at home or abroad.

Pirie¹² has made a study of the characteristics of shrapnel bullets as compared with other bullets, etc. In his experience there are two bones only which a shrapnel ball cannot penetrate, viz., the femur and the vault of the skull. He has seen no case in which a shrapnel bullet has entered the brain. He also remarks that when such a ball enters the body it stays there, that is, it does not traverse and come out. An analysis of a series of 10,000 plates taken in the course of one year is of some interest.

Those interested in the brain surgery of the War will find Gamlen and Smith,¹³ who have made a study of the "Inter-relation between the Radiography and Surgery of Gunshot Wounds of the Head," worth reading. Some fine radiographs illustrate this paper, but, as is pointed out, this class of work lends itself especially to stereoscopic views, and it is the original stereoscopic plates viewed in the stereoscope which are of paramount importance. The radiographic technique is fully described, the value of the different positions of the head are shown, and there are sections on the interpretation of the negatives, etc. Stress is laid on the fact that the pineal body not infrequently casts an x-ray shadow—ten cases of this are recorded,—and it is easy to see that this shadow might be taken for a piece of bone driven into the brain. It is necessary to remember that even with the best of radiographs, stereoscopic and otherwise, and with every care, fractures of the skull may not show.

Expectoration of a Bullet.—A case of some interest is reported by Leslie,¹⁴ and shows the possibilities which are present when a foreign body is in the lung. The man was shot just above the right clavicle, and had two attacks of pneumonia following the injury; four months later an x-ray examination showed a large piece of metal $4\frac{1}{2}$ in. deep, to the left of the mid-line and about

the middle of the thorax. Three weeks later, in the act of coughing, he expectorated a piece of metal weighing 140 gr., and a further radiograph showed the absence of the foreign body; a good recovery resulted.

Foreign Body in the Arterial Circulation.—Cases have been reported of foreign bodies loose in the venous circulation, but O'Neill¹⁵ reports one in which a fragment of a shell was in the arterial. A screen examination of a wounded soldier showed a foreign body diagnosed from its position and movements as being probably in the left ventricle. The following day a further examination showed no foreign body in this position, and it was eventually found in the abdomen, 2 in. deep, and 1 in. below and to the left of the umbilicus. A post-mortem was held on the following day, when the fragment had moved onwards again, and was found at the bifurcation of the left common iliac artery. The man lived for five days from the date of being wounded.

Removal of Foreign Bodies.—Rayner and Barclay¹⁶ note a case of the successful removal from the brain of a small metal fragment which was 2 in. deep beneath the scalp in the Rolandic area on the right side. After trephining it was removed under *x*-ray direction by means of Barclay's extractor, the time for its actual extraction being three minutes. The slight extent of the disturbance to the brain may be judged by the fact that there was no paralysis even on the day following the operation. The patient made a slow but satisfactory recovery. A description of the extractor and the method of its use is embodied in the paper.

In an exhaustive article, Brown¹⁷ discusses the question of the value of the röntgen ray in the diagnosis of **Pulmonary Tubercle** in war times. This is really an attempt to estimate the value of an *x*-ray examination amongst the recruits of the U.S. Army, to obtain from the careful examination of groups of men the percentage showing definite *x*-ray signs such as would warrant a non-acceptance for war services; also to estimate the cost of the examination if carried out on a large scale, as compared with the result of the future saving to the country in medical expenses and pensions. To take a typical result: out of 1000 men *x*-rayed, 0.2 per cent were definitely rejected who would have been accepted but for *x*-ray findings. At this ratio 2000 would have been rejected out of 1,000,000. The author works this out to make that the country would be saved two million pounds at a cost of one thousand pounds, the expenses of each examination being reckoned for each man as being equal to the pay of a private for a single day. This paper is full of interest and very practical. All the results were controlled by experts, both clinicians and radiologists, and the results arrived at deserve careful attention.

REFERENCES.—¹*Amer. Jour. Rönt.* 1918, 113; ²*Lancet*, 1918, i, 96; ³*Amer. Jour. Elect. and Rad.* 1917, Oct.; ⁴*Amer. Jour. Rönt.*, 1917, 445; ⁵*Arch. Rad. and Elect.* 1917, Dec., 211; ⁶*Amer. Jour. Rönt.* 1918, 275; ⁷*Arch. d'Elect. Méd.* 1917, Feb.; *Arch. Rad. and Elect.* 1918, Aug., 73; ⁸*Lancet*, 1918, i, 2; ⁹*Ann. Surg.* 1917, July, 13; ¹⁰*Amer. Jour. Rönt.* 1918, 229; ¹¹*Ibid.* 1918, 59; ¹²*Arch. Rad. and Elect.* 1917, Oct., 138; ¹³*Ibid.* 1918, Jan., Feb., 240, 270; ¹⁴*Brit. Med. Jour.* 1917, ii, 648; ¹⁵*Ibid.* 1917, ii, 719; ¹⁶*Ibid.* 1918, i, 226; ¹⁷*Jour. Amer. Med. Assoc.* 1918, i, 516.

NEW APPARATUS.

Coolidge and Moore¹ describe a portable röntgen-ray generating outfit on entirely new lines, and especially designed for Army work (Fig. 8). The power is obtained by means of a gasoline electric set furnishing an alternating current. The *x*-ray and filament transformers, the filament current control, etc., are all contained in one small box, on the top of which are a voltmeter, an adjustable rheostat, and milliammeter. The paper gives a detailed description of the apparatus, with numerous illustrations showing its construction,

and complete wiring diagrams. The great advantages are the simplicity of the outfit, its high efficiency, its light weight, and portability. It may be described as being practically fool-proof. A further point is that it is easily adapted to work off existing electric currents without running the gasolene set.

A new radiator type of *hot cathode x-ray tube*² completes the outfit. This tube is built on the same principles as the ordinary Coolidge tube, but is only

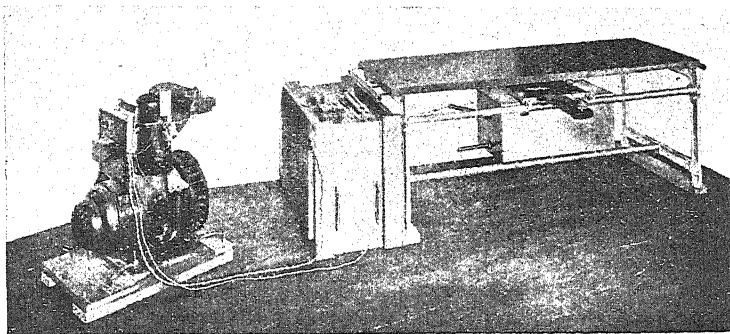


Fig. 8.

$3\frac{3}{4}$ in. in diameter. The target—of tungsten—is fixed into a block of copper which is welded to a stem extending through the glass anode arm and ending in a large radiator. This arrangement ensures rapid cooling of the tube between the exposures. The tube rectifies its own current. It is designed to carry 10 ma. at a 5-in. parallel spark-gap for a long enough time to make plates, and to take 5 ma. at the same spark-gap indefinitely, for screening purposes. This tube can be used in any of the ordinary protective boxes, or it can be

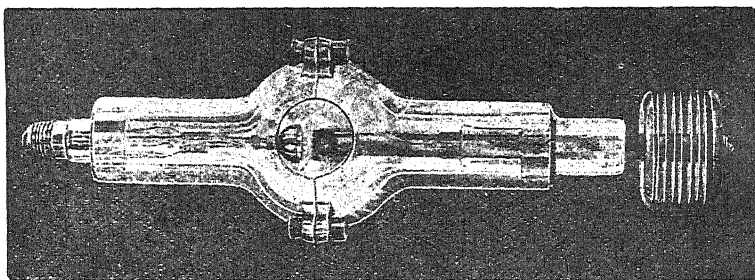


Fig. 9.

closely surrounded with a lead glass shield open only opposite the anticathode, where a circular hole allows of the passage of the *x-ray* stream (Fig. 9).

Another new type of Coolidge tube³ with a diameter of $3\frac{3}{4}$ in. bulb has been introduced for fine focus work. Its focal point is extremely fine, and great detail is obtained in cases where large amounts of energy are not required. The milliamperage passed varies from 25 to 8 as the parallel spark-gap varies from 2 in. to 6 in. This tube must not be used with more than its maximum

amount of energy, or the metal at the focal spot will be melted and volatilized. It is not suitable for therapeutic work.

The necessity of using accumulators for heating the spiral of the Coolidge tube has always been felt to be a drawback, and Jordan⁴ advocates the use of an interrupter in conjunction with a small step-down transformer to do away with the necessity for these accumulators (*Fig. 10*). The secondary winding supplies the heating current, and an adjustable rheostat in the primary circuit provides the fine regulation. He considers this a perfect method of controlling the temperature of the spiral, and it can be run for hours at a time. An interesting and important point is made that less current is needed, only 3.5 amps. as against 4.8 amps. with a battery. Hernaman-Johnson,⁵ writing

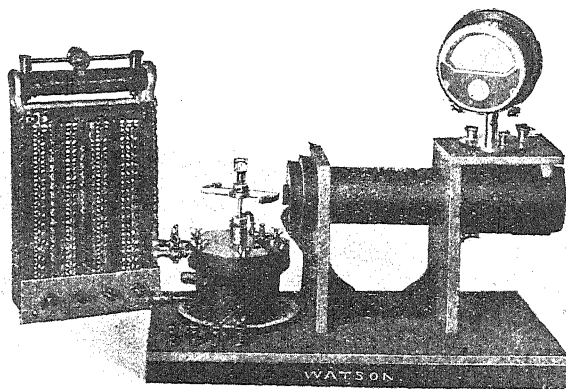


Fig. 10.—Jordan's method of control for Coolidge tube.

on the same subject, describes his method when working with a Coolidge tube, and a coil and mercury break outfit on a 220-volt main. He inserts a resistance which will pass a maximum of 6 amps. at 220 volts with a variable resistance in series designed to reduce the heating current to a minimum of 3.5 amps. An ampèremeter and fuse are also placed in the circuit. These resistances are earthed at the power station, through the central neutral earthed wire. In administering 200 treatments under the above system he has found no drawbacks, and no trouble has developed owing to the grounding of the negative high-tension pole. A further paper⁶ by the same author discusses the various methods now available for heating the filament, and should be referred to.

REFERENCES.—¹*Jour. Rönt. Soc.* 1918, April, 43; *Gen. Elect. Rev.* 1918, Jan., 60
²*Arch. Rad. and Elect.* 1918, June, 11; *Jour. Rönt. Soc.* 1918, April, 38; ³*Arch. Rad. and Elect.* 1918, Feb., 291; ⁴*Proc. Roy. Soc. Med. (Elect.-ther. Sect.)*, 1918, Jan., 20; *Arch. Rad. and Elect.* 1918, March, 307; ⁵*Arch. Rad. and Elect.* 1917, Nov., 174; ⁶*Ibid.* 1918, May, 365.

X-RAY DIAGNOSIS.

Esophagus.—Morton¹ describes a case of remarkable dilatation of this organ in a woman, age 50, complaining of intermittent vomiting for thirty years. Even without an opaque meal there was a large rectangular shadow taking up most of the right chest area. Numerous radiographs show the varying appearance of the food shadow at intervals after the meal, and on

one occasion some of the food remained in the cesophagus as long as twenty-seven hours after it had been swallowed. The whole organ seems to be dislocated to the right of the mid-line. Cardiospasm may have been the cause, but the case differs in many features from those usually seen in this condition.

Stomach.—In making an analysis of 400 dyspeptic patients, Hill² utters a word of warning against the too prevalent idea that all that is necessary in such cases to arrive at a correct diagnosis is the report of the x-ray examination. He points out that too many physicians have come to depend upon the use of the röntgen ray in **Gastro-intestinal** work to such a degree that, when a patient complains of stomach trouble, they at once send him to an x-ray specialist, expecting to obtain an exact diagnosis. One result of this attitude is that the radiologist is apt himself to overlook the limitations of radiology, and to fail to realize that this method of examination is only a part of the examination of a case, a part which must be fitted in with other findings and with the history of the case. There are times when a positive and final diagnosis is possible from an x-ray examination alone, without the collaboration of other departments; but there will be fewer cases sent to operation through a mistaken diagnosis when patients have the benefit of an opinion based upon a complete examination from all points of view.

Morton³ describes another case of **Hair-ball** in the stomach in which the diagnosis was made from the x-ray examination. This radiograph once more confirms the shape of the stomach as demonstrated for the first time by x rays and the opaque meal as being the true shape of the organ. A further case is reported by O'Brien,⁴ in which the diagnosis was made by radiography. He reviews the literature of this subject, the two most important papers being one of Butterworth in 1909, when in 42 collected cases the correct diagnosis had been made prior to operation in 5 only; and the other in 1914 by Matas, who collected 76 cases. Since the latter was published, only two further cases have been noted, so it is fair to conclude that this type of foreign body in the stomach is a rarity, but one which must not be overlooked in making a diagnosis of an obscure case.

Perkins⁵ lays much stress on the information of definite value which can be obtained by the administration of the '*sediment*' mixture on an empty stomach. The mixture consists of 6 oz. of water plus 1 oz. of barium sulphate. With the patient in the vertical position it should be watched into the stomach, and then by palpation under the screen it can easily be shifted to all portions of the stomach cavity, outlining the borders and filling any small pockets which may be present. It can also be pushed through the pylorus into the duodenum, visualizing these parts. The writer, while fully admitting the value of plates, thinks this preliminary method with the screen often gives information of greater value, and is not sufficiently recognized as a routine. The opinion is also expressed that it is better the röntgenologist should make his examination and arrive at a diagnostic decision before consulting the clinical data; otherwise he may be unduly influenced by the clinical findings.

Hirsch and Landsman⁶ give a very complete and exhaustive description of the routine to be followed in the study of the whole of the gastro-intestinal tract. Their routine is designed to be capable of general application, and to have the virtues of expediency, efficiency, and economy (of time and material), and such as to meet the demands made upon it both in hospital and private practice. The paper deals with the various kinds of opaque meals and materials, describing the advantages and disadvantages of each. It enters into all points to be made out or which are capable of x-ray demonstration, and details the exact method of bringing out their diagnostic values. It should be of special use to beginners in x-ray work, and to those who have

not had much experience in the diagnostic possibilities of this method of examination. It is clearly written, and exact in its details.

Duodenum.—Downes⁷ publishes the notes of a case of the somewhat rare condition known as **Giant Duodenum**. The patient was a male child, age 4½ years, who had a history of vomiting from birth. The stomach shadow appeared to be normal 15 minutes after an opaque meal, whilst in the right abdomen was a large curved shadow of an enormous duodenum—the shadow being practically as large as that of the stomach itself. The stomach, 2 hours later, was almost empty and the duodenal shadow had increased in size; 24 hours after the meal there was some food in the colon, but the dilated duodenum still contained a large quantity. At the operation the whole duodenum was found to be dilated up to the point where the gut passed under the superior mesenteric artery; no cause for the stenosis was found. The x-ray appearances were very striking.

Gall-bladder.—Writing of the value of the x-ray examination in **Cholelithiasis**, Case,⁸ from a study of his own and the statistics of other reliable workers, concludes that it should be possible to get shadows of diagnostic reliability in 50 per cent of gall-stone cases. He divides them into three classes: (1) Those where the stones consist entirely, or almost entirely, of pure cholesterin—these are invisible to x rays; (2) Those in which the lime content is so great that it is practically impossible to fail to get shadows; (3) Those in which the lime content is relatively low and the stone can be made out only by means of the most careful technique. Additionally, in 85 per cent of gall-bladder disease apart from stones, it is possible to get x-ray indications which will demonstrate the site of the trouble. He believes that the time has arrived when all suspected cases should be x-rayed, but that whilst positive results are of value, no reliance can be placed on negative findings.

Heart.—Vaquez and Bordet⁹ have described a radiographic method for estimating the development in depth of the left ventricle. They recall that the left ventricle does not form much of the anterior aspect of the heart, being mostly deep in the mediastinum, and in order to detect incipient hypertrophy one must ascertain the depth to which it reaches backwards. Their technique is based on the method of similar triangles first utilized by Mackenzie Davidson in the localization of foreign bodies. The patient is placed behind a screen, either in the vertical or the horizontal position, the screen being at a fixed distance of 60 cms. from the anticathode. They prefer the vertical position as being easier to immobilize the patient, and the figures given are with the patient in the upright position. With the diaphragm nearly closed, the central ray is directed on the apex, and a mark made on the screen at the edge of the shadow of the apex. A millimetre rule is then taken, and a mark 10 cms. distance from the first mark is made on the screen. The tube is then shifted to the observer's left until the central ray passes through the second mark. The diaphragm is opened wide, and a third mark made corresponding to the edge of the new profile of the apex. The distance between the first and the third marks is then read off in millimetres, and the figure obtained is termed "the index of development of the heart in depth." They point out that owing to the anatomical position of the left ventricle previously referred to, the apex itself may be in the physiological position, but with any hypertrophy of the ventricle the shadow-shift on the screen will be correspondingly increased by the ventricular wall deep in the mediastinum. By a series of observations on normal hearts they have estimated the range to be between 7 and 14 mm. (generally about 10). The range of soldiers on active service is 8 to 10 mm. In cases of pathological enlargement the figure rises to from 18 to 30 mm. The method is applicable to the bases of both ventricles. The

determination in the case of the base of the left ventricle is said by Widal and Lapointe¹⁰ to be of particular value in the case of hypertension in **Nephritis**, as in these cases it is at the base of the left ventricle that hypertrophy may first manifest itself.

Etienne and Lamy,¹¹ by means of radiographic examination, have found that **Hypertrophy of the Left Ventricle** is constantly present in aviators after five months of flying, and that this hypertrophy develops in two phases—the first of rapid growth, so that appreciable enlargement occurs in the course of some months; and a second slowly progressive increase, shown by the outline of the left ventricle, which brings the apex close to the nipple line, even in men who have been flying for two to three years.

Bardeen,¹² as a result of the *x*-ray examination of hearts, has drawn up tables with a view to show the relations of the heart silhouette areas to the length of the transverse diameter, the body weight, the heart weight, the height, etc., for either sex. He describes the technique employed to standardize the radiographs, and explains how the tables can be used for the estimation of heart conditions in various cases.

Lungs.—A valuable illustrated paper by Overend and Hebert¹³ on the radio-diagnosis of **Pulmonary Tuberculosis** and its different forms came at a time when such a diagnosis was and is being constantly demanded from radiologists both with regard to recruits and also to men who have been invalided out of the army as suffering from tubercle. The authors divide their paper into some twenty-six short paragraphs, each dealing pithily with one or more salient points, and the whole forms a very concise and complete record of the various conditions which can be demonstrated by means of *x* rays. As a reference paper it should be of much use.

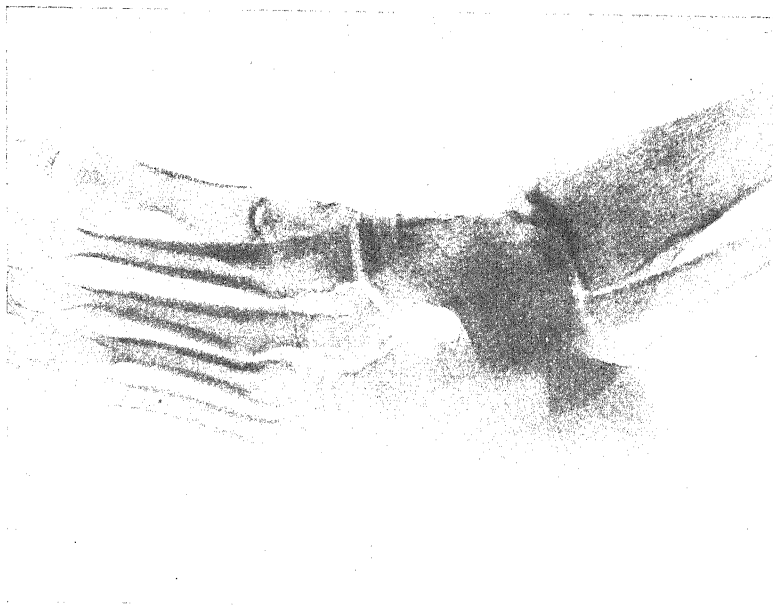
Pancoast¹⁴ suggests that röntgen examination in pulmonary tuberculosis should prove useful in two distinct types of cases: (1) To confirm a positive and certain clinical diagnosis and demonstrate the exact extent of the lesion; and by far the more important, (2) It should be dependable as a means of diagnosis in the case with suspicious but doubtful signs and a negative sputum. Apart from gross lesions, early phthisis manifests itself in one of three ways, depending upon the anatomical distribution of the disease—a hilus lesion, peribronchial infiltration along the larger subdivisions of the bronchial tubes, and infiltration in the parenchyma around the bronchioles and their terminations. All these are discussed in detail, and the significance of the findings contrasted with the clinical aspects of cases. The author agrees that it does not seem to be safe teaching that activity can be definitely determined by an *x*-ray examination alone. Good radiographs are used for illustration.

By means of a series of cases—the radiographs are reproduced—Chapin¹⁵ demonstrates and contrasts the physical and clinical findings with those of radiography in the examination of various pathological chest conditions met with in children. Especially he calls attention to the want of correspondence in the conclusions drawn from the two methods of examination in abnormal heart conditions, and to the difficulty of diagnosing hilum infiltration and enlarged nodes in the mediastinum by physical signs alone.

Weil and Loiseleur,¹⁶ by injecting air into various fluid-containing cavities after evacuating the fluid, claim to have obtained valuable diagnostic assistance from the radiographs taken following on this procedure. The paper deals especially with conditions of the pleura, and they demonstrate that this injection of air shows up the condition of the adjacent lung tissue in a striking manner. Additionally, remarkable radiographs of a pericardial effusion sac, a hydrocele, and a knee-joint are reproduced. The technique is explained, and

PLATE IV.

CONGENITAL DEFORMITY OF THE TARSUS



C. Thurston Holland

stress is laid upon the necessity of strict aseptic precautions. No accidents, either general or local, have happened to any of their cases.

In *Carcinoma of the Lung*, McMahon and Carman¹⁷ point out that there are three main types of primary carcinoma of the lungs: the infiltrating, the miliary, and the mixed. A stereoscopic x-ray examination will easily point to a primary lesion and its probable nature. The areas of increased density are usually quite typical, and can be differentiated from such areas caused by other conditions. A careful correlation of the x-ray findings with the history and the physical and laboratory findings, usually make a diagnosis possible.

Manges¹⁸ does not consider the x-ray examination of *Acute Pneumonia* is of great value except in the very early stages, and when dealing with late complications. In the latter conditions x rays are absolutely indispensable in demonstrating *Interlobular Abscess*. He expresses the opinion that no aspiration for a suspected *Empyema* should ever be made if it is possible to have a preliminary x-ray examination; pointing out that the mortality from empyema is 28 per cent, and that some of this mortality is due to needless trauma and infection from the exploring needle. The diagnosis of the post-pneumonic complications which the x ray has made possible has given us the new surgery of the lung. Radiography has demonstrated that the old idea of a central pneumonia—which has been subjected to so much ridicule—is correct, and that no pneumonia begins at the periphery but always at the hilus, from which it extends to the periphery. The focus of infiltration may be localized by the x ray a few hours after the initial chill—long before there are any physical signs to indicate the process. This paper, written by a physician and a professor of clinical medicine, is a great tribute to the value of x rays, not only in pneumonia but in other conditions of the lung and thorax; but the writer regrets that x rays have led to the neglect of the careful physical examinations which were made prior to the discovery of their diagnostic value.

Bones.—Those interested in the congenital absence or defect of bones in the extremities will find a paper by Lewin¹⁹ full of interesting material, and illustrated by many radiographs of both common and rare conditions. A full bibliography is added. The paper is written largely from the aspect of the cause, or causes, of these abnormalities, and it is suggested that when a great many of these cases are reported, especially with accompanying radiographs, the embryologist will have a more definite working basis to enable him to unfold the etiology. The various theories of causation come under review, authorities being quoted in detail, whilst treatment is also discussed. The author suggests that the subject should be given more attention in the attempt to work out a definite etiology, as there is probably a broad fundamental principle involved.

Thurstan Holland²⁰ reports two very rare cases, with illustrations, of congenital deformity affecting bones of the feet and hands. In one case there was symmetrical fusion of tarsal and metatarsal bones in both feet, added to a symmetrical fusion of certain carpal bones, etc.; (1) The os calcis and cuboid completely fused; (2) The external cuneiform partially fused with the third metatarsal; (3) The middle cuneiform completely fused with the second metatarsal; (4) The astragalus completely fused with the scaphoid (*Plate IV*). The condition was exactly the same in both feet, which to external appearances were quite normal. In the other case, in which the fusion of the tarsal bones was different, the condition affected one foot only. The literature of these conditions is small, and apparently nothing exactly like them has been previously described.

Salmond²¹ describes a new technique for obtaining a lateral view of the upper

end of the femur, including the head, neck, and trochanters, which is of special value when dealing with foreign bodies situated in this region. The patient lies on the couch in the lateral position, with a pillow supporting his head, and with the hip to be examined against the table. The plate is placed in position below the patient and flat on the table. The lower limb, resting on the table in the lateral position, is securely fixed by sand-bags. Then the patient allows the body and the other leg to swing gently backwards, and, in so doing, it will be found that the fixed femur does not take part in the movement.

In an elaborate communication, Stenvers²² describes the röntgenology of the os petrosum, illustrated by a large number of radiographs and diagrams. He has fully worked out the exact angle of skull and x-ray tube necessary to obtain shadows uncomplicated by other parts of the skull, and gives full and lucid directions for technique. The practical importance of his work is evidenced by cases in which he was able to diagnose radiographically a left-side acusticus tumour on the one hand, and a fracture of the os petrosum through the ductus semicirculares on the other. All his radiographs were taken by the ordinary flat projection. McKenzie and Knox²³ have experimented on the dead bone by taking stereoscopic radiographs after threading a wire through the Fallopiian canal, and consider that their results are of great value from the anatomical standpoint, and for teaching purposes.

Groover²⁴ lays stress on the importance of making lateral radiographs in *spinal conditions*, and is sure that this position is not employed enough. He prefers the straight lateral position to the oblique. The paper deals almost solely with the technique to be employed in order to obtain successful results, and this is entered into with elaborate detail. Using always a Coolidge tube and a plate focus distance of never less than 24 in., the exposures are not less than 30 seconds, the author considering that speed is unnecessary and better results follow on long exposures.

In a paper on the difficult subject of "Röntgenographic Pelvimetry," MacKenzie²⁵ describes a method of making measurements from a radiograph taken under fixed conditions, and comparing these measurements with those of a 'standard' normal pelvis. The principle is based on the statement that on the standard plate the measurements of the distances between certain fixed points bear a definite relationship to one another, and that, given a deformed pelvis, this ratio no longer holds good. The paper is illustrated by drawings from radiographs of deformed pelves, and tables are given which show the manner in which the diameters can be worked out and compared with the normal. The advantages of a method of this kind, if it proves reliable, are the ease with which it can be carried out, and the minimum of discomfort to the patient compared with other methods of pelvimetry.

In "Differential Diagnosis of Bone Tumours," Baetjer²⁶ insists upon the importance of four cardinal points, namely, invasion, bone production, point of origin, and condition of the cortex, to determine whether the growth is malignant or benign. He discusses the various bone tumours seriatim with regard to these four points, and endeavours to lay down rules by which it should be possible from a consideration of the x-ray appearances to classify these tumours as benign or malignant, and also arrive at an exact diagnosis as to the nature of the disease. There are many points in this paper which deserve careful consideration, and which have a very practical bearing.

Somewhat wider in its scope, Stewart's²⁷ paper on "The Röntgen Diagnosis of Bone Lesions," illustrated with many beautiful radiographs, visualizes the differences of the x-ray appearances in many bone conditions. Emphasizing the point that the x-ray picture is of the utmost value as an aid to diagnosis, it is nevertheless not a picture of disease, but only a record of varying resist-

ance to the passage of x rays by the part under examination. It is the correct interpretation of the meaning of these various shadows which is the art of röntgenography, and this entails on the part of the radiologist a full knowledge of the clinical expressions of the various affections and the various shadows consequential to them. These two papers should be read together.

The bone changes in **Leprosy** are fully dealt with by Honeij,²⁸ who quotes a large number of papers and gives extensive references. This paper is a very complete record of the subject to date, and is illustrated with many typical cases and radiographs. It is evident that bone changes can be demonstrated radiographically in an early stage of the disease; all cases show bone and bone-salts absorption; periostitis, cyst or cavity formation, obliteration of joints, and ankylosis often occur; and definite atrophic changes in bones are seen without any other apparent changes; total absorption of phalanges is seen. The bones of the hands and feet show the changes soonest, and to the greatest extent; the changes in the nerve type are atrophic, and in the nodular type inflammatory and hypertrophic.

Bunting,²⁹ in dealing with *sequestra in war injuries*, points out that this is practically a new radiographic problem. The subject is treated from the statistical standpoint of successes and failures in x -ray diagnosis, and these statistics, as well as the comments of the writer, emphasize the real difficulties of x -ray diagnosis. Many typical radiographs are shown, and these still further emphasize the difficulties. An attempt is made to lay down the lines on which a definite diagnosis can be safely made, but it is evident that even when this appears to be certain the surgeon may nevertheless fail to find and remove a sequestrum. On the other hand, it seems to be quite certain that a reliable negative diagnosis cannot be made by radiography, even in late conditions.

Hall-Edwards³⁰ draws attention to the question of *fracture of sesamoid bones*, and publishes a case in which he considers that the radiographic evidence suggests such a fracture. The same condition is also recorded by Scales.³¹ Neither of these cases went to operation, and in view of this it is an open question as to whether the bone was actually fractured, or whether both cases are not examples of development from two centres of ossification. Those interested in this subject may refer to a paper in the *Annals of Surgery* for 1912, p. 101, by Muller, of Philadelphia, in which a full report of all the literature up to that date is given, and in which cases are recorded which were operated upon and the diagnosis of fracture confirmed. The first record of the possibility of this condition being shown by x rays is to be found in the *Archives of the Röntgen Ray*, January, 1901, p. 54, in which Payne published a radiograph, and suggested a fracture.

Johnston³² has made a thorough research into the conditions of the "Pituitary Region in Intracranial Lesions," and illustrates his paper with a large number of radiographs of this region. He lays stress upon the facts that there is a wide variation in the size and character of the sella turcica which must be considered within the limits of the normal; that in idiopathic epileptics, in a large proportion of the cases, there are definite changes in the region of the pituitary; that pituitary struma manifests itself by deformation and destruction of the sella, rarely by visualization of the tumour itself; that every patient showing evidence of optic atrophy, bitemporal hemianopsia, papillo-œdema, or loss of vision, ought to have a careful röntgen examination.

Campion,³³ with three years' experience of the difficulties of getting good radiographs of jaw and tooth cases in wounded soldiers, has designed a special tube-holder and centering device and director to meet the difficulties. His method involves a new position of the patient, who lies fully extended on his

back; the tube slides up and down the side of the length of the examining table, and is adapted for stereoscopic work. The accuracy with which position can be obtained—and repeated—is remarkable. [This new technique marks a considerable advance. Originally designed for jaw and tooth work, with a little ingenuity and with a minimum of cost it can be adapted to practically any of the modern upright tube-stands, and is most accurate and invaluable for head work of all descriptions. To take an example—the sella turcica can be focused with the greatest of ease and accuracy, and (and this is of the greatest importance) without any preliminary screening. The two illustrations (*Plate V, A, B*) evidence this unmistakably.—C. T. H.]

Dandy³⁴ describes a method of examination of the brain after the injection of air into the cerebral ventricles. He has removed cerebrospinal fluid from the ventricles of some twenty children and replaced the drawn-off fluid by the injection of air, and no deleterious effect has been recorded. The technique is fully explained, and a series of very extraordinary radiographs is used to illustrate the paper. The air shadow diminishes day by day, and eventually disappears. In one case of internal hydrocephalus it required two weeks for this to take place. The outlines of the lateral cerebral ventricles are sharply outlined in the radiographs, and the author states that 'ventriculography'—the name he applies to this original investigation—has already proved of great practical value in the diagnosis and localization of intracranial lesions, and that it is invaluable in internal hydrocephalus.

Knee-joint.—A radiographic study of the knee-joint capsule by Snell³⁵ strikes out a new line of investigation. Using a dilute bismuth solution of the consistence of ordinary cream, he injected a knee-joint immediately after death to the point of making the capsule tense. Radiographs were then taken in various positions, some of which are reproduced to illustrate the paper. These map out the joint very clearly in the different planes in which the radiographs were taken. Probably this method and the combination of stereoscopic radiographs would be still more striking.

Trichina.—Gouldesbrough³⁶ shows that in the disease caused by the *Trichina spiralis* calcified cysts can be detected by x rays from three to six months from the commencement of symptoms, and are diagnostic. He says that the x -ray appearances are quite typical. Numerous small, dense, sharply defined areas, ovoid or discoid in shape, appear in the soft parts and unconnected with the bones. In a few instances a transparent rounded area could be seen in the centre of the shadow, but in most of the cysts the density is uniform. In a case published—with radiograph—the provisional diagnosis of trichiniasis was completely confirmed by the x -ray examination.

Kidney.—Manges³⁷ puts forward a claim for *pyeloscopy* in addition to pyelography in elucidating certain kidney problems. He uses a Coolidge tube so arranged that a rapid alteration can be made from the condition required for screening to that for taking a plate, and makes the latter with an instantaneous exposure, with the aid of an intensifying screen. By this means he controls the injection of the opaque solution with great accuracy, and is able to record the exact appearances as seen on the screen, and so avoid any chance effect. The radiographs which he uses for illustration show very definitely the control obtained and the value of the method in making exact diagnoses in somewhat obscure cases. In one case of especial interest, he shows how it was possible to differentiate a tumour thought to be a kidney tumour from the kidney, and to prove that it had nothing to do with the latter.

Cameron³⁸ issues a preliminary report on aqueous solutions of potassium and sodium iodides as opaque mediums in röntgenography. A 50 per cent solution of either is almost completely opaque to x rays; it is a clear solution,

PLATE V.

CAMPION'S METHOD OF CENTERING

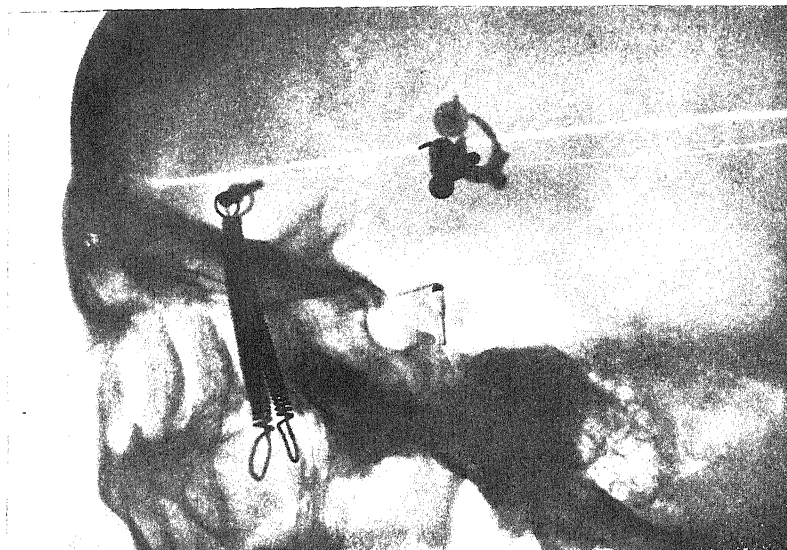


Fig. A.—Campion's method of centering as applied to a skull. A wire rod is laid along the top of the posterior clinoid processes and is fixed in position by a piece of plaster bent at right angles. The rod is represented by a dot: the plaster by right-angled lines.



Fig. B.—To illustrate Campion's method of centering as applied to the pituitary fossa of a living subject.

and can readily be sterilized by boiling. A 15 per cent solution will give a good picture of the human bladder, and one of 25 per cent should be strong enough for pyelography. This is only a preliminary report, and the author suggests caution when using it for human subjects until the further study of effects has been made. So far there have been no ill results.

REFERENCES.—¹*Proc. Roy. Soc. Med. (Elect.-ther. Sect.)*, 1918, Jan., 16; ²*Amer. Jour. Rönt.* 1917, Dec., 601; ³*Proc. Roy. Soc. Med. (Elect.-ther. Sect.)*, 1918, Jan., 15; ⁴*Boston Med. and Surg. Jour.* 1918, i, 396; ⁵*Med. Press and Circ.* 1918, July, 83; ⁶*Med. Rec.* 1918, June, 1021; ⁷*Ann. Surg.* 1917, Oct., 436; ⁸*Ibid.* 1917, July, 69; ⁹*Paris Méd.* 1918, No. 6, Feb., 113; ¹⁰*Jour. d'Urolog. Chir. et Méd.* 1913, April; ¹¹*Bull. Acad. de Méd. Paris*, 1918, lxxx, 151; *Brit. Med. Jour.* 1918, ii, 263; ¹²*Amer. Jour. Rönt.* 1917, Dec., 604; ¹³*Arch. Rad. and Elect.* 1917, Dec., 153; ¹⁴*Amer. Jour. Rönt.* 1917, Sept., 462; ¹⁵*Jour. Amer. Med. Assoc.* 1918, i, 1357; ¹⁶*Presse Méd.* 1917, Dec., 683; ¹⁷*Amer. Jour. Med. Sci.* 1918, i, 34; ¹⁸*N.Y. Med. Jour.* 1917, ii, 917; ¹⁹*Amer. Jour. Rönt.* 1917, Sept., 431; ²⁰*Arch. Rad. and Elect.* 1918, Jan., 234; ²¹*Ibid.* 1918, March, 297; ²²*Ibid.* 1917, Sept., 97; ²³*Ibid.* 1918, June, 18; ²⁴*Amer. Jour. Rönt.* 1918, Jan., 10; ²⁵*Brit. Med. Jour.* 1918, i, 612; ²⁶*Amer. Jour. Rönt.* 1918, May, 260; ²⁷*Ibid.* 1918, Feb., 77; ²⁸*Ibid.* 1917, Oct., 494; ²⁹*Arch. Rad. and Elect.* 1918, Sept., 105; ³⁰*Ibid.* 1918, May, 381; ³¹*Ibid.* 1918, Aug., 83; ³²*Amer. Jour. Rönt.* 1918, Nov., 555; ³³*Arch. Rad. and Elect.* 1918, Sept., 114; ³⁴*Ann. Surg.* 1918, July, 5; ³⁵*Brit. Med. Jour.* 1918, i, 717; ³⁶*Lancet*, 1918, i, 468; ³⁷*Amer. Jour. Rönt.* 1918, April, 165; ³⁸*Jour. Amer. Med. Assoc.* 1918, i, 754.

RADIUM AND X-RAY THERAPY.

Stevenson¹ advocates the use of radium in military orthopædic surgery for the treatment of Scars due to wounds—not necessarily those showing keloid changes, but those which are painful and are responsible for delay in obtaining full functional use. He gives full doses from the emanation filtered through lead, and describes his technique exactly. It is suggested that radium applied by this method acts as a true 'fibrolysin,' and that it often has an immediate effect. Cases are quoted in which pain, and the adherence of scars to bone, both disappeared rapidly. In those cases in which massage and other means of treatment had failed to produce further improvement, the application of the radium had given a fresh start towards recovery. Amongst other conclusions, the author claims that it softens and mobilizes scar tissue; it enables structures adherent to the scar, such as tendons, to free themselves; its effect is rapid and sometimes immediate; and it is particularly useful in treating scars and adhesions in the hands and fingers. An important point is, that this method causes no inconvenience to the patient. [We have had an opportunity of seeing the results of Stevenson's treatment of a large number of cases at the Alder Hey Hospital. These cases were seen at intervals by the surgeons in charge and myself. Unanimously we came to the conclusion that in many cases—especially those involving the hands and fingers—where stiffness, restricted movements, atrophic changes, etc., were present; in which the usual treatments—massage, electrical, and surgical—had been persisted in for lengthy periods of time; and when the cases had come to a standstill,—the immediate result of radium irradiation was to give the case a fresh start. Increased movement followed almost at once, and the re-application of the subsequent massage, etc., not only kept up but increased this improvement. There seemed no doubt as to the benefit derived; but it must be remembered, in order to avoid disappointment, that no claim for a cure, or even of permanent benefit, is brought about by the radium alone; it is only claimed that it gives the case a fresh start on its way to recovery, and that this start must be maintained and added to by subsequent massage, electrotherapeutic measures, hydrotherapy, and surgery.—C. T. H.]

The report of the London Radium Institute (Pinch)² for 1917 differs from its predecessors in that an attempt is made to draw from the experience of

the past 6½ years, and to indicate in some measure the late results of treatment. During the period named some 40,000 applications have been given to about 5000 cases, of which about one-half (including cases of rodent ulcer) were malignant disease. Each class of morbid condition is dealt with in a separate section, the general results are indicated, and a few cases are referred to in more detail. The reader should refer to the report itself, or the abstract, for much reliable information. It is interesting to note that when used for exophthalmic goitre, radium may at first cause an exacerbation of all the symptoms; but usually within six weeks or two months tachycardia lessens, the tremors diminish, the exophthalmos becomes less noticeable, and the restlessness and irritability decrease. This exacerbation of symptoms does not appear to follow *x*-ray treatment, the rule being an almost immediate effect for the better following the first few doses of *x* rays.

Lazarus Barlow³ has attempted to produce **Carcinoma** by radium, and has carried out a long series of experiments upon animals since 1912. These experiments include: (1) The insertion of radium tubes beneath the skin of rats; (2) The introduction of gall-stones into the gall-bladders of rabbits. In the latter case a fundamentally different result was obtained, depending upon the gall-stone being free, or not, from free radium. If containing radium, then, in the lining membrane of the gall-bladder, the epithelium showed changes indistinguishable from those occurring in columnar-celled carcinoma, whilst in one case a metastasis occurred in the liver. The paper should be referred to for a full account of these experiments and their results, and also of other experiments performed upon mice.

Duane⁴ describes his methods of preparing and using radio-active substances in the treatment of **Malignant Disease** and of estimating suitable dosages. After a short account of the nature of radium emanation there follows a good description of the methods for collecting it, and the various types of applicators are described and illustrated. Three measuring instruments for estimating the quality of the activity of the emanation in any given applicator, at any time, are described and made clear by illustrations. A short account of some cases and the methods adopted for their treatment concludes a paper which is a valuable addition to the many already written on this subject; to beginners in radium therapy it should be of special value.

A series of experiments upon plants, and their results, are described by Levin and Levine⁵ from the Cancer Research Department of the Montefiore Hospital under the title of the "Biological and Clinical Evidence of the Therapeutic Value of Radium and Röntgen Rays in Cancer." Essentially these experiments were based on the theory that the 'crown-gall,' a tumour-like formation found on a great variety of plants, which is caused by a parasite, and which may be induced artificially, is a disease affecting plants completely identical with animal and human cancer. There is, they say, a complete analogy between the two conditions, crown-gall and cancer being new growths caused by a continuous limitless proliferation of a group of cells within a tissue, the normal cells of which do not proliferate. Briefly, numerous plants were inoculated and immediately exposed to *x*-ray treatment, whilst simultaneously, control plants also inoculated were not treated. Numerous photographs are shown of the results obtained, together with microphotographs of the disease. The broad point arrived at was that all control plants developed a large crown-gall, whilst the majority of the radiated plants either showed no trace of the inoculation, or merely a minute swelling at its site. One result of this experimental work leads to the conclusion that it is advisable in certain classes of cases of malignant disease to give treatment before the operation, with the intention of sterilizing and inhibiting the proliferation of

those cancer cells which may be left behind or transplanted elsewhere in the course of an operation.

Levin and Joseph's⁶ paper on the morphological appearance of cancer clinically cured by radium and x rays should be read in conjunction with the above. The authors state that the first morphological change which occurs is either carcinoma or sarcoma after irradiation are observed in the tumour-cells themselves, and is manifested by the vacuolation of the protoplasm, pyknosis of the nuclei, karyolysis, and ultimately complete necrosis; and they consider that the connective-tissue formation appears subsequently. Further, their investigations, clinical and experimental, show that the proliferating powers and clinical malignancy of cancer cells may be impaired by irradiation without any changes in the morphological appearance of the tumour being produced; also that it is quite probable that the first effect of the rays on every malignant tissue consists in the inhibition of this proliferating power. It follows on this that the morphological appearances of irradiated tissue is not an absolute criterion of the therapeutic effect produced. Radiated and non-radiated cancer tissues may have the same microscopic appearances, and still the former may have been sterilized and lost its clinical malignancy. The conclusion is reached that it is imperative every malignant tumour should be treated before operation.

Burman⁷ in a paper on "New Growths of the Mediastinum," believes that as soon as a diagnosis is made and confirmed by radiography, treatment with radium should be instituted promptly, and when this is not available x rays should be tried. Eight cases are reported, with illustrations both before and after treatment, the pictorial results of which are very striking, in some cases the radiographs showing practically the entire disappearance of huge growths. A considerable amount of radium—a gram or more—is stated to be necessary to obtain these results, and, in order to secure deep penetration and to avoid skin injury, lead filters to absorb all but the penetrating gamma rays should be used.

In the radium treatment of **Carcinoma of the Buccal Cavity**, Greenough⁸ has had at his disposal the emanation from 1000 mgrms. of radium. This has been applied in small capillary tubes. Out of 19 cases of cancer of the lip, 11 showed but little benefit, 4 improved, and 4 were apparently cured. Twenty cases of cancer of the palate, tonsils, and buccal mucosa showed only a temporary benefit. Eleven cases of cancer of the upper jaw were all refractory and not materially influenced; 6 out of 36 cases of the lower jaw had distinct benefit. In 22 cases of the tongue and floor of the mouth, 3 only showed definite improvement. He points out that in carcinoma in and about the mouth, surgery yields relatively poor results, and that the hope that radium might offer a notable improvement in the treatment of these cases has proved to be true only to a very limited extent.

Newcomet,⁹ under the title of "The Present Status of Radium," gives a short but practical account of the apparatus required, the methods of application, filtration, etc., discusses the injurious effects of radium, makes a comparison between radium rays and x rays, and reviews the whole range of cases in which radium is, or may be, of use. An extensive bibliography is quoted. This paper is of distinct use as a very complete *résumé* of the whole subject, and should serve as a valuable reference paper to those who have only a superficial knowledge of radium possibilities, and who wish to learn more from a concise and unbiased review; the general practitioner of medicine will find it of special value.

Howard Kelly¹⁰ has treated 210 cases of **Fibroid Tumour of the Uterus** of all ages with radium, and states dogmatically his opinion that in the great

majority of these cases this treatment is the one of selection. His results certainly appear to justify this conclusion, and in this paper a careful analysis of the cases and the results obtained furnish a very striking picture of what can be expected if a sufficient quantity of radium is available. Stress is laid upon the importance of pre-treatment diagnosis, and he considers there should be no doubt as to the accuracy of diagnosis before this line of treatment is adopted. He also emphasizes the fact that even if radium fails, the operation has simply been postponed without any detriment to the patient. In describing the technique two methods are used: (1) A single intra-uterine dose of 1500 millicurie hours (3 hours with 500 millicuries of the emanation) is sufficient to produce amenorrhœa and shrinkage or complete disappearance of the tumour; or (2) The same result can be obtained by a radiation with a gram of radium at a distance of 4 in. from the skin distributed at various points over the tumour. Filtration of all except the gamma rays is of course necessary. This paper is one demanding careful consideration.

Writing as an obstetric physician, Phillips,¹¹ in an address on the "Therapeutic Influence of α rays on Female Pelvic Disease," lays stress upon two points: (1) That an accurate pre-treatment diagnosis is imperative; (2) That the treatment should be carried out by an expert under the supervision of a gynecologist. After quoting the opinions of eminent radiologists on the questions of dosage and administration, he reviews the classes of cases in which α rays are indicated, discussing the advantages and disadvantages of this treatment as compared with operative procedures. The chief conditions coming under review are **Fibroids, Carcinoma, various Hæmorrhagic Conditions,** and the question of **Sterilization**. Illustrative cases are given in short detail. As a result of personal observation he concludes that α rays are a powerful remedy which, with increasing accuracy in diagnosis and administration, promises to be of inestimable value in the pathological female economy.

Pfahler,¹² discussing the "Possibilities and Limitations of Röntgen Therapy" in **Malignant Disease**, points out that, generally speaking, a period of discouragement has followed on one of enthusiasm; he also emphasizes the fact that the technique and skill of individual operators is so varied that a comparison of results is almost worthless. The general scope of this paper is to criticize in detail each main form of malignant disease in which α -ray treatment is possible, and to point out its possibilities. His conclusions embrace the following points: (1) It is possible to cure the majority of cases of superficial malignant disease by röntgen therapy, and it is possible to cure, in the absence of metastases, all the cases by a combination of α -ray therapy and electric-coagulation; (2) Patients can be greatly benefited even when the disease has extended to bones, glands, and internal organs, but cannot then be permanently cured; (3) α rays, with proper technique, will cure the majority of cases of **Sarcoma**.

Saberton,¹³ in a consideration of the value of α rays in the treatment of **Malignant Disease of the Breast**, as a result of ten years' personal experience, divides his cases into three groups: (1) Those sent for prophylactic treatment following operation; (2) Those for the treatment of recurrences; (3) Inoperable cases. His paper discusses each group from the points of view of technique and results, both of which are fully entered into. In concluding, he draws attention to two rare conditions he has noticed as arising from the results of radiation. The first is a late α -ray reaction. He has seen three cases of this description. In each the skin and subcutaneous tissues of the irradiated area became tough, assumed the appearance of wash-leather, and finally sloughed. The curious point is that this occurred weeks or months after the cessation of the treatment. The second is that in half a dozen inoperable cases an

anæmia developed in patients to whom intensive therapy had been given for a number of years, and in whom the primary growth had shrunk without any evidence of secondary deposits, etc. The general conclusions are on the whole favourable to *x*-ray treatment.

Darier,¹⁴ under the title of "Radiotherapy for Superficial Cancer," warns against indiscriminate radiotherapy to all kinds of malignant growths, and considers that in lobulated epithelioma, such as smoker's cancer of the tongue and lips, cancer of the external genitals or anus, cancer of cicatrices, and lupus, this method of treatment is not only useless, but is contraindicated, inasmuch as, after an apparent improvement for two to three weeks, proliferation becomes more active, and that cases which might be operable become inoperable. In **Melanic Sarcoma**, or cancer which develops in a nævus, it is wasting time to dally with radiotherapy. In **Secondary Nodules** in the skin—such as are seen so frequently in mammary cancer—although bunches may subside, the prognosis as a whole is not modified.

Further papers have appeared on the treatment of **Tuberculous Peritonitis** by *x* rays, and Weil,¹⁵ who has been systematically treating cases since 1914, using large filtered doses of very penetrating rays, reports most favourably. In every case in which there was not already generalization of the disease in the lungs or pronounced cachexia, a complete cure was rapidly realized, with complete restoration of the general health. He advises the use of a Coolidge tube, a 5 mm. aluminium filter, a 20 cm. spark-gap, and 1.5 to 2 ma. current. The exposures are repeated each month, the dose being 12 to 14 H units in the course of four successive days to the four quadrants of the abdomen. In cases of great debility the series is spread over from ten to twelve days.

Rechou¹⁶ finds that *x* rays modify the connective tissues which form round nerves after war wounds, disintegrating this tissue without affecting the nerve itself. He gives one large dose each month—10 to 12 H units under an aluminium filter. **Keloid** and **Painful Cicatrices** are also favourably modified. A large number of cases are quoted, and very favourable results followed. In a group of 5 cases where the cicatrix after a wound was adherent and interfered with function, the use of the limb was regained more or less completely after a few exposures. The young **Cicatricial Tissue of War Wounds** is apparently easily influenced by *x* rays.

Hernaman-Johnson,¹⁷ whilst still considering that *x*-ray treatment for **Exophthalmic Goitre** suffices as a rule, is of the opinion that the addition of galvanic electrical measures sometimes make all the difference between success and failure. For the tachycardia he advocates the use of a rhythmically interrupted sinusoidal current between the gland itself and the back of the neck, set at a rate slightly slower than that of the pulse. When the nervous symptoms are pronounced and the tremors persistent, he combines cerebral galvanism with the *x* rays. This paper gives full details of the methods of application, and also deals shortly with other disorders of the ductless glands and their treatment.

REFERENCES.—¹*Lancet*, 1918, i, 432; ²*Brit. Med. Jour.* 1918, i, 348; *Report Radium Inst.* 1917; ³*Proc. Roy. Soc. Med. (Path. Sect.)*, 1917, Dec.; *Brit. Med. Jour.* 1917, ii, 794; ⁴*Boston Med. and Surg. Jour.* 1917, ii, 787; ⁵*Ann. Surg.* 1918, April, 442; ⁶*Jour. Amer. Med. Assoc.* 1917, ii, 1068; ⁷*Ibid.* 989; ⁸*Boston Med. and Surg. Jour.* 1918, i, 598; ⁹*Surg. Gyn. and Obst.* 1917, Sept., 201; ¹⁰*Ibid.* 1918, Oct., 402; ¹¹*Lancet*, 1918, i, 427; ¹²*Trans. Amer. Med. Assoc.* 1917, Sept., 985; ¹³*Brit. Med. Jour.* 1918, ii, 337; ¹⁴*Bull. de l'Acad. de Méd.* 1918, June, 431; *Jour. Amer. Med. Assoc.* 1918, i, 605; ¹⁵*Paris Méd.* 1917, Oct., 289; ¹⁶*Jour. de Rad. et d'Elect.* 1917, June, 557; ¹⁷*Arch. Rad. and Elect.* 1918, Aug., 91.

Part II.—The Dictionary of Treatment.

A REVIEW OF MEDICAL AND SURGICAL PROGRESS FOR 1918, BY MANY CONTRIBUTORS.

ABDOMEN, SURGERY OF.

E. Wyllys Andrews, A.M., M.D.

Drainage and Posture.—Dr. Raymond Reynders¹ discusses the value of posterior drainage in abdominal surgery, giving reasons why this possesses advantages: (1) It preserves the abdominal viscera from disturbance in front; (2) It favours isolated adhesions in the less movable parts; (3) Fluid accumulations and exudates flowing backwards are less likely to spread with bodily movements; (4) The flow of the discharges towards the deep pelvis is in the same direction as the faecal matter, which is so loaded with micro-organisms, and this also limits the spread; (5) Resorption of toxic material is less rapid in the lower posterior peritoneum than in the upper anterior.

On the other hand, G. Lerda² attaches great importance to anterior drainage, assisted by ventral decubitus. Patients can be rested comfortably lying face downwards with the head and shoulders elevated, thus combining the Fowler position with anterior gravity drainage; though he admits that perirectal drainage through the Douglas, especially in women, alone effects a satisfactory outlet in the lowest point of the pelvis. When the peritonitis is very diffuse and its area advanced, ventral decubitus alone offers ideal drainage. The difficulties of this position are not insuperable, as by the aid of cushions, etc., the majority of patients can adapt themselves to it.

The same position is advocated by Roland Hill.³ *Figs. 11, 12* show two methods of combining the prone and Fowler positions, both of which have become very popular since the work of Fowler and Murphy in America. Hill reports 104 drainage cases in a St. Louis hospital during 1917. In 15, using the lateral position, there was no mortality, and in 42, using the prone position, there were but 2 deaths. Nineteen of these were cases of perforated appendicitis, 5 of general peritonitis, and 11 of localized abscesses; in all but one of the appendix cases there was gangrene and suppuration. On the other hand, 47 cases with the older Fowler position gave 5 deaths. In all these cases peristalsis is controlled by the use of opiates, no food or water being given by the mouth, and fluids being furnished freely by proctoclysis.

The Acute Abdomen.—Deaver,⁴ of Philadelphia, discusses the acute abdomen. The greatest number of acute perforations occur in the appendix. Next in frequency is perforated ulcer of stomach or duodenum, and next probably infections and perforations of the gall-bladder. Gangrenous cholecystitis is too often overlooked until the ominous sign of 'too late' dooms the patient. Hence the lurking menace of gall-bladder inflammation should not be ignored. Acute pancreatitis also gives alarming symptoms, while subacute pancreatitis is more common and more amenable to treatment. Pancreatitis can be relieved by prompt operation, while late operation is followed by high mortality. Acute intestinal obstruction causes one-fourth of the cases of abdominal crisis. The

cause of the obstruction is a matter of no importance, inasmuch as an incision must be made early for exploratory operation: the greatest factor in the mortality is undoubtedly delayed surgical intervention. Deaver now admits that some cases of acute infection, as an appendicitis more than forty hours old, have a tendency to localize, and may require conservative management rather than operation, when there are signs of a rapid subsidence of the infection.

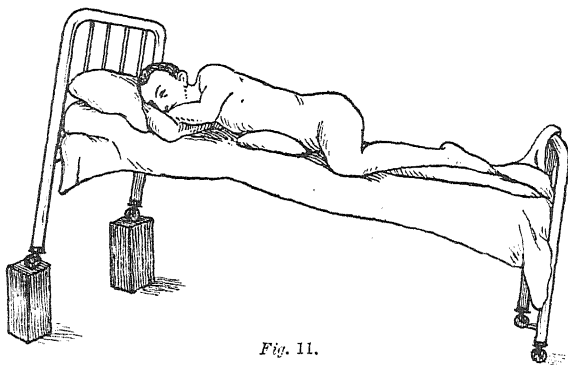


Fig. 11.

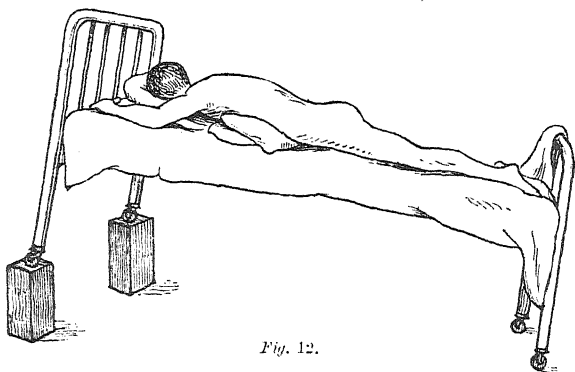


Fig. 12.

Methods of combining the prone and Fowler's positions. (Redrawn from 'Annals of Surgery'.)

Incision in Laparotomy.—Willy Meyer,⁵ of New York, reports numerous cases of laparotomy with the transverse abdominal incision, following the technique of Pfannstiel, Springel, and others. He advocates rectangular flaps in the upper abdomen rather than oblique cuts. A method of Kehr of right-angled incision to explore the gall-tracts has proved useful in his hands.

REFERENCES.—¹*Arch. Méd. Belges*, 1917, Nov., 1009; ²*Gior. d. r. Accad. di med. di Torino*, 1917, lxxx, 119; ³*Ann. Surg.* 1917, Oct., 414; ⁴*Med. Rec.* 1918, Jan. 12; ⁵*Jour. Amer. Med. Assoc.* 1917, Nov. 17.

ABORTION.

W. E. Fothergill, M.D.

ETIOLOGY.—G. D. Royston¹ has made a detailed study of 164 patients who had 664 pregnancies, 348 of which ended in the death of the foetus either by abortion or stillbirth at full term. Of the 164 patients, 51 confessed to having had abortion induced once or more. These 51 had had 220 pregnancies, 118

of which were interrupted. The writer's figures show that 23·8 per cent of the abortions in his series were artificial, and this agrees with the estimate of Taussig, who believes that more than 25 per cent of all abortions are criminally induced. Of the writer's patients, 46 gave a positive Wassermann reaction, and 5 more had definite syphilitic histories, though, having had treatment, their reactions were negative. Only 12 of these 51 cases showed any lesions or gave any history of the disease. They had 186 pregnancies, 115 of which ended in abortion, while of the children born alive 14 died within the first few days. Syphilitic women abort in over 60 per cent of their pregnancies, and the interruption may occur at any period of gestation.

There were 40 patients whose abortions were traced to extra-genital conditions, namely, anæmia, pyelitis, nephritis, heart disease, tuberculosis, splanchnoptosis, and obesity. In two cases the only cause found was lead poisoning in the father. The effects of lesions of the genital organs can hardly be estimated, for of the writer's 164 patients, only 13 showed perfectly normal genitalia. The writer shows that 60 per cent of the induced abortions in his cases resulted in more or less permanent sterility. Less than one-third of the syphilitic women gave any history or showed any physical signs of the disease. Renal deficiency appears to interrupt pregnancy only in the event of a renal decompensation which produces symptoms such as a rise in blood-pressure, lassitude, headache, insomnia, or somnolence. These indications of threatened interruption of pregnancy are often amenable to treatment. A poor state of nutrition is not usually the primary cause of an abortion, but is generally a symptom of a more important underlying condition such as syphilis and impairment of the heart, lungs, or kidneys. The writer considers the phthalein test a valuable but not infallible index of the renal condition.

REFERENCE.—*Amer. Jour. Obst.* 1917, Oct., 563.

ACNE VULGARIS.

E. Graham Little, M.D., F.R.C.P.

Strickler¹ reports some experimental observations he has made on the causation of acne vulgaris. He considers the disease is due in the vast majority of instances to the acne bacillus, which is normally present in the skin, and that this organism is activated to become pathogenic by certain factors, chief of which is the colon bacillus, or its toxins, as shown by complement-fixation tests. It would seem from these that a special variety of colon bacillus is found in acne patients, and disturbances of the gastro-intestinal tract play an important part in the production of the disease. The author, on the other hand, does not regard seborrhœa as an exciting factor. His experiments do not support food anaphylaxis as a cause. Sexual conditions have a considerable, but not very easily discriminated, share in predisposition to the disease. The use of cosmetics also plays its part in increase of the affection.

Brown² has some useful practical hints for the management of a case of acne. He rightly insists on the importance of cleansing the surface with hot **Boric Acid Compresses**, and evacuating pustules and comedones; it is a useful measure to produce slight exfoliation with 5 per cent **Salicylic Acid Paste**, as a preliminary to other applications. When the skin is greasy, a 1 per cent solution of **Iodine** in benzine is particularly effective. **Sulphur** is probably the best direct medication to apply. It may be combined with a mercurial where the red oxide is used, as this alone of the mercurial compounds does not form the black sulphide when mixed with sulphur. The author lays some stress on the desirability of compounding ointments with pleasant perfumes, of which a combination of terpineol and concentrated natural oil of roses is perhaps the best. **Baker's Yeast** advocated (p. 8).

Hazen³ considers X-ray treatment the most certain method of promoting a cure, but gives the warning that there is considerable risk of unpleasant happenings, and counsels only experts to undertake the treatment. He uses a focal screen distance of 9 in., a spark-gap of $7\frac{1}{4}$ in., and a milliampère reading of 4, with no filtration. The time of exposure was 45 seconds. This was given at three-weekly intervals, but the author suggests that it is probably more prudent to give a third of this dosage once a week. In all the cases no other local treatment was used.

REFERENCES.—¹*Med. Press and Circ.* 1918, Jan. 30, 84; ²*Ther. Gaz.* 1918, April 15, 263; ³*Jour. Amer. Med. Assoc.* 1918, ii, 977.

ACNITIS.

E. Graham Little, M.D., F.R.C.P.

Knowles¹ records a case of acnitis in a negro, and claims this to be the first example of the disease in that race. (Mention was made of a case of acnitis in an Egyptian soldier, *MEDICAL ANNUAL*, 1918, p. 566.) The patient was 26 years old, and had had the disease for six months. It was limited to the face and neck, and was very copious, fully 200 lesions being present. Physical examination of the chest suggested the presence of tubercle, but no bacilli were found. The von Pirquet reaction was positive, the Wassermann negative. Tubercle bacilli were not found in the sections of the skin examined. No inoculation experiments could be carried out. Four months after the patient came under observation all the active lesions had disappeared, leaving pitted scars. Treatment, which included 'mild' local applications and x rays, apparently had little effect.

REFERENCE.—¹*Jour. Cutan. Dis.* 1917, Feb., 62.

ACOUSTIC TUMOURS. (See NERVUS ACOUSTICUS.)

ACTINOMYCOSIS.

E. Graham Little, M.D., F.R.C.P.

Taraknath Sur¹ describes very carefully and fully three cases of this rare disease occurring in natives of Bengal. It is to be distinguished from mycetoma pedis—a much commoner affection in India—the organism of which is a higher form of fungus. In all three cases the typical ray fungus was demonstrated in the discharge and was grown in pure culture. The disease is often confounded with tuberculosis, but the tuberculin reaction is negative, and the demonstration of the fungus is easy, and conclusive as to the cause. The following directions are given for isolating the typical grains. The discharges are washed with normal saline rendered alkaline with 5 per cent of caustic potash, and the grains are thus separated and can be transferred to culture media, such as ordinary agar-glycerin-agar and broth. Contaminations can be prevented by keeping the tubes at 60° for half an hour and then raising the temperature to 79°, which is the optimum. The washed isolated grains are mounted in 50 per cent glycerin, flattened out on a slide, and examined with a low power, when the typical ray arrangement of fungus is easily seen. Therapeutic results with *Autogenous Vaccines* given in doses of 10 to 40 million fragments were disappointing.

REFERENCE.—¹*Ind. Med. Gaz.* 1918, Jan., liii, 5.

ADENOIDS.

P. Watson-Williams, M.D.

Isabel Ormiston¹ reports very favourable results from a method of treating adenoids by artificially inducing Sneezing, introduced by Handcock. The sneezing is produced by lightly touching the nasal septum near the tip of the nose with a slightly irritating powder made from powdered iris root and soap, combined with 'handkerchief drill,' and the procedure is carried out daily for three weeks or more.

Of conditions leading to incorrect diagnosis of adenoids, Dabney² mentions extension of the vomer back to the pharyngeal wall, covered with degenerated membrane, causing the mirror to give a perfect picture of an adenoid, only corrected by digital examination under anæsthesia. He deprecates digital examination as a routine method of diagnosis, though it is valuable under anæsthesia for locating the position, size, etc., of the mass to be removed. Again, a temporary enlargement due to a recent cold should not be regarded as adenoids requiring removal. Intumescence of the turbinates due to children drinking much fluid or failing to evacuate their bladders at bedtime, or even chronic constipation, may cause mouth-breathing and restless sleep. He has seen many cases of children with an anaphylactic affection, chiefly for eggs and milk, in whom symptoms resembled adenoids. Dabney lays great stress on the delicacy and reliability of tympanic drum retraction in children as a test of the presence of adenoids.

REFERENCES.—¹*Lancet*, 1918, Aug. 24; ²*Boston Med. and Surg. Jour.* 1917, i, 875.

ALCOHOLISM. (See DRUG ADDICTION AND INEBRIETY.)

ALOPECIA.

Ultra Violet Rays advised (p. 23).

AMŒBIASIS.

Sir Leonard Rogers, M.D., F.R.C.P.

Much further work has been done, chiefly by army medical officers, on amœbic dysentery and its treatment. F. W. Cragg¹ deals with cases invalided to Bombay from Mesopotamia. *E. histolytica* was found in the stools of one-fourth of the patients, mostly in the cystic stage. He agrees with Wenyon and O'Connor that it is not justifiable to detain and treat healthy men for such cyst infections. W. MacAdam² has also examined the stools of over 2000 men, mostly invalided from Mesopotamia, after a preliminary saline purge, which they found considerably increased the percentage of positive results obtained. Of 1165 admissions to the dysentery ward, 10 per cent showed *E. histolytica* infections on a single examination, which will not detect nearly all the cases. He came to the conclusion that at least one-third of the troops were infected, and considers it of little value to clear a few of the gross carriers by prolonged treatment and observation as a prophylactic measure. **Emetine** treatment does not appear to greatly diminish cystic infections, while **Emetine Bismuth Iodide** is still on its trial for that purpose. C. Dobell and A. C. Stevenson³ record three cases in which they believe *E. histolytica* infections persisted for 16, 23, and 34 years respectively.

THERAPEUTICS.—H. H. Dale and Clifford Dobell⁴ have recorded extensive experiments on the action of **Emetine** and other drugs on the *E. histolytica* which throw a new light on the subject. They infected a series of kittens by enemata containing the amœbæ, killed them when nearly moribund, and prepared emulsions of the intestinal mucus in normal saline containing numerous active amœbæ, on which they tested the drugs. They showed that emetine did not always kill all the organisms even in a 1-1000 solution, and obtained very little action with greater dilutions. One strain resisted for a time even a 1-100 solution. These results fail to confirm the statement of Rogers that 1-10,000 rapidly killed the amœbæ in human dysenteric stools and 1-100,000 killed many of them in a longer time, and they suggest that the amœbæ in stools which have been passed for some time may lose much of their resisting powers. [I accept this explanation.—L. R.] Methyl-psychotrine, a natural alkaloid of *ipecacuanha* present in small quantities, was much more actively toxic for *E. histolytica* in vitro, and also much less toxic for mammals; but clinically, even in large doses, it was entirely devoid of therapeutic action in

man. On the other hand, emetine, which is so effective in amœbic disease in man, was powerless in kittens infected with the same amœba. They therefore conclude that the therapeutic efficiency of emetine depends in some way on its action on the host rather than on the parasite.

D. de la Paz and R. Montenegro⁵ have investigated the action of emetine on the kidneys to see if its irritant effect on other tissues was also evident on the renal function, but came to a negative conclusion.

TREATMENT.—

1. Of *Amœba Carriers*.—Margaret W. Jepps and J. C. Meakins⁶ obtained 95 per cent of cures with **Emetine Bismuth Iodide**. They found cachets of loose powder the best mode of administration. Symptoms of irritable heart in their patients were greatly reduced. Methyl-psychotrine was useless. D. G. Lillie and S. Shepherd⁷ found **Salol-coated Tabloids** of the same drug more effective than keratin-coated ones, and obtained 70 per cent of cures with the former. The same writers⁸ also report on trials of the Mexican plant **Chaparro Amargosa** and on **Simaruba Bark**, both of which Dale has shown to contain very similar bitter principles, which have a distinct toxic action, and decoctions cured about half the cyst cases treated with them. Dale and Dobell⁴ found no action on the amœbæ of even a 1-2 decoction of chaparro amargosa, although D. Nixon had claimed that it killed the *E. histolytica* up to 1-10,000,000 within a few minutes. Nevertheless the drug is active against cases of amœbic dysentery in which even emetine has failed, thus confirming Dale and Dobell's view that tests in vitro on the parasite do not give reliable information on the clinical value of drugs in amœbic disease.

2. Of *Amœbic Dysentery*.—A. C. Lambert⁹ has treated cases with a combination of **Emetine and Emetine Bismuth Iodide**, and found that although the latter alone failed in acute cases, yet in 2-gr. doses in pill form it did not cause sickness; and, combined with emetine hypodermically, convalescence was more rapidly established and fewer carriers resulted. H. L. Watson-Wemyss and T. Bentham¹⁰ also obtained good results by the same combination. D. Graham,¹¹ in Salonika, gave 1-gr. doses of emetine hypodermically for twelve days, followed by emetine bismuth iodide if cysts remained present, with success.

REFERENCES.—¹*Jour. Ind. Med. Assoc.* 1917, Oct., 301; ²*Lancet*, 1918, i, 15, ³*Trans. Soc. Trop. Med. and Hyg.* 1918, Feb., 168; ⁴*Jour. Pharm. and Exper. Med.* 1917, Dec., 399; ⁵*Philippine Jour. Med. Sci.* 1918, Jan., 49; ⁶*Brit. Med. Jour.* 1917, ii, 645; ⁷*Jour. R.A.M.C.* 1917, Dec., 700; ⁸*Lancet*, 1918, i, 501; ⁹*Brit. Med. Jour.* 1918, i, 116; ¹⁰*Lancet*, 1918, i, 403; ¹¹*Ibid.* 1918, i, 51.

AMPUTATIONS.

E. W. Hey Groves, M.S., F.R.C.S.
Cecil A. Joll, M.S., F.R.C.S.

During the past year or so the chief advances have been in the direction of the so-called kineplastic stump, which is dealt with in detail below, and in the formulation of definite rules to govern the sites of amputation, considered with a view to efficient and easy application of the artificial limb. This problem is partly surgical, partly economic, and partly military, so that the methods laid down must be regarded from that point of view, and not as necessarily ideal in civil surgery.

In the treatment of acute cases at the front there has been a tendency to abandon the guillotine amputation except in very rare instances, as it has been found that short flaps, especially if they be everted for a few days, in cases of gas gangrene, etc., give as good results as regards mortality, while allowing a greater length of the limb to be preserved.

Muirhead Little,¹ in a paper to consider the influence of the modern type of artificial limb on the choice of methods of amputation, contrasted the differ-

ing necessities in the case of the upper and lower limbs respectively. In the upper limb the movements are delicate and nicely co-ordinated, while the chief function of the lower limb is as a supporter of the body weight and as a means of propulsion. This author states that end-pressure and leverage are the strains which it has to withstand. In the upper limb, on the contrary, there is little end-pressure, but leverage is all important. It must be admitted, he says, that the best artificial arm and hand is but a poor substitute for the real thing; but for the lower limb, in many cases, a very fair degree of success in the carrying out of the main functions can be secured with a well-fitted artificial appliance.

Weight is borne in two ways: (1) By direct pressure of a part of the body such as the end of a stump or some bony prominence, e.g., the tuber ischii; or (2) By oblique pressure, when the artificial socket forms a more or less conical cavity into which a portion of the limb fits. Leverage is resisted by the lateral faces of the stump.

This writer gives the following description of the ideal stump: It should be as long as possible; should be covered by sound movable soft parts; the scar should be placed in such a position as to be free from pressure; and it must not be adherent to bone. It must have enough muscles attached to it to move it with adequate force, and there must be no inflamed areas or sensitive nerve-endings or bulbs. The bone surfaces must be rounded so as to avoid hurting the soft parts next to them. The blood-supply must be free and the skin well nourished. He objects to exarticulation, which has certain theoretical advantages, because: (1) The articular enlargement present in all long bones makes the stump-end bulbous, and this is extremely difficult to fit with an artificial limb; (2) The artificial joint must either be fitted below its normal level or at the side of the limb, and both of these are unsightly and inconvenient; (3) To cover such a large bulbous bony end it is necessary to use extensive flaps, and these are, therefore, often thin and poorly nourished. These objections do not apply to disarticulations at the hip and shoulder.

Weight-bearing Stumps.—Muirhead Little says that before the war the types of operation called osteoplastic, and designed to produce stumps capable of bearing end-pressure, were rapidly gaining favour. As a type of such may be mentioned the Stokes-Gritti. Stumps of this kind are, however, rarely feasible in war surgery, since they must be done in conditions which ensure freedom from infection during the after-stages. He claims that it is desirable to obtain a stump which will bear some weight, for every pound of weight which can be borne by the end of the stump means all the less to be carried elsewhere.

Chapple,² discussing the Stokes-Gritti method, considers that the cause of failure with it in many cases is due to the patella being drawn up by the quadriceps, and he advises that the attachment of the latter to the patella should be cut across and the patella then sutured to the periosteum of the femur.

Muirhead Little¹ says further that there is a conflict of opinion as to the weight-bearing capacities of stumps, and he quotes Gocht and Dollinger³ as saying that in their experience hardly any stumps were fit to bear weight, while Seidler, of Vienna, maintained that nearly three-fifths of those he had seen were capable of bearing some weight. Little agrees with Seidler's estimate, and says that over half of the cases seen by him at Roehampton were capable of using a weight-bearing pad. There was considerable difference between the various amputations and their capacity in this direction: only 9 per cent of the stumps at the upper third of the thigh were able to bear weight; at the middle third 32 per cent; and at the lower third 77 per cent. Among 14 Syme's stumps there were 12 weight-bearers, or 86 per cent, and all

the Stokes-Gritti cases (3) and the Pirogoffs (2) had that capacity. This author calls attention to the large number of high thigh stumps with unsatisfactory skin covering, a most disabling state of affairs, while he asserts that adherent scars in the upper limb are often compatible with the comfortable wearing of an artificial limb. According to Little, osteophytes are rarely a cause of disability.

Choice of Different Sites for Amputation.—*Upper Limb.*—Little discusses this in detail, and the main points he makes are as follows: A forequarter amputation gives a stump to which an artificial limb can be fitted, and some degree of movement is possible in the latter. In exarticulation at the shoulder the lines of the scar should avoid the clavicle and acromion, because the shoulder cap must press on these.

Amputations at the upper third of the arm offer little hold for the socket of an artificial limb, as the axillary folds get in the way, but Alwyn Smith has devised a plastic operation to overcome this difficulty.¹ Little advises great care to conserve all possible bone here in order to get the longest available stump, even at the risk of an adherent scar, which he says rarely gives trouble. Concerning the elbow region this authority holds that it is preferable to amputate just above the condyles rather than at the elbow-joint itself, unless, indeed, it may be possible to get even as little as one and a half inches of forearm bones, which is far better. It is often advisable, he says, to remove the remains of the bellies of the forearm flexors, carefully preserving the biceps in order to facilitate the fitting of the appliance. The middle third of the forearm gives good stumps, but not the lower third as a rule, and in spite of the loss of the pronator quadratus Little prefers to sacrifice that part of the forearm, rather than remove the limb at the wrist. Below the wrist it is worth while to preserve the carpus and the base of the metacarpus if possible, as long as they are movable, as the resulting stump can actuate an artificial thumb with some force.

Lower Limb.—Little gives it as his considered opinion that disarticulation at the hip or amputation at the mid-trochanteric level is preferable to the upper third of the thigh, as he claims that the short stump so produced is quite unable to move a thigh bucket efficiently. He prefers the appliance called the 'tilting table' to the bucket for these high levels. At the lower levels of the thigh, he says it is important to cut the adductors long and, if possible, stitch them to the end of the bone or near by, lest, when they retract, the fleshy mass just below the pubes should form an obstacle to fitting the prosthesis. He warns against allowing the thigh stump to become flexed—a very common trouble during the after-treatment—as such cases require specially tedious treatment to fit them for a limb. The lower third of the thigh affords an almost ideal stump for prosthesis.

In the leg below the knee the best site is the lower part of the middle third. The old seat of election, about 4 in. below the joint, is intended for a kneeling leg, but with skilled fitting it is possible to make use of a rather short stump. At the lower third of the leg the bone surface is small and the skin often poorly nourished, so that it does not often give a satisfactory result. The fibula should be cut an inch shorter than the tibia, as it bears pressure ill. Little supports the Syme operation, and mentions that the bone section should be transverse to the main axis of the leg, and not to the incurved lower third; also that the section should be made well above the internal malleolus to avoid a bulbous end. Pirogoff's operation is not favoured by this author, on the ground that if the calcaneum is not firmly united to the tibia it soon becomes displaced, and under the most favourable circumstances the stump is too long for a good limb. Chopart's gives a poor result, as the short stump

becomes plantar-flexed, so that unless the metatarsus can be preserved it is better to do a Syme.

Kellogg Speed,⁵ discussing the indications for amputation, holds that in acute sepsis and secondary hæmorrhage cases are often left too long, and gives the advice, "Make the indication rigid, but amputate early." He gives statistics of 121 amputations with 35 deaths (29 per cent). Among these were 27 for gas gangrene, with 12 deaths; 27 arms and forearms, with 11 per cent deaths; 23 legs, with 18 per cent mortality; 71 thighs, with 40 per cent deaths. He analyzes these cases very fully, and concludes with the following details as to technique: Avoid the guillotine amputation, since re-amputation will be required and an unnecessary amount of limb will be sacrificed. Use a circular incision as a routine, and reflect a long flap. In septic cases cut the muscles high transversely, avoiding the pyramidal method, which is to be reserved for clean cases; cut the bone still higher, and remove the periosteum from the lower inch of the bone end; finally, curette out the marrow from the lower three-quarters of an inch, and fill the cavity with B.I.P.P. Hæmostasis should be careful, and may for speed require mattress sutures for the muscles. Dry gauze packs should be replaced by paraffined dressings next the tissues.

Martin,⁶ describing his experiences in amputations of the *thigh*, mentions that in his first six weeks his death-rate was 70 per cent, while after six months it was 16 per cent, although the type of case was graver than in the earlier group. He affirms that it is not an operation attended by much shock if correctly carried out. In shocked or toxæmic patients, he says speed is all-important, and the choice of an anæsthetic comes next. Martin advises ethyl chloride, and stops the anæsthetic as soon as the bone has been severed and the sciatic cut; and he performs a circular amputation transverse to the axis of the limb.

Chalier,⁷ unlike most recent writers, still prefers the guillotine operation for thigh amputations, and he also gives a detailed analysis of 46 cases.

Quénu,⁸ in an elaborate article, well illustrated, discusses at length the Chopart amputation, and disagrees with what has been written above and with Tuffier. He says that most of the stumps he examined were satisfactory, and although a certain number showed plantar-flexion of the foot, this is not necessarily a bar to the success of the case unless it be extreme, and that the ordinary degrees are very amenable to treatment by an elastic tractor. Quénu also states that the sub-astragaloid stump gives good results. He approves of the Pirogoff group of operations as well as the Syme, and he dissents strongly from the school which teaches that it is useless to conserve the hinder part of the foot and that amputation through the lower part of the leg is preferable, because the latter have to use an artificial limb while the former can walk with a modified boot.

Trèves and Paramelle,⁹ on the contrary, adopt the view that these conservative foot operations are of little value, and recommend the lower third of the leg as being preferable in all cases.

The Kineplastic Stump—Vanghetti's Operation.—A large number of papers have appeared recently on this subject. Stassen¹⁰ defines the kineplastic operation as "the art of fashioning the bones and the soft parts in amputation stumps so that the patient may move, voluntarily and directly, the different segments of the artificial limb."

The author of an article in the *British Medical Journal*¹¹ gives a short *résumé* of the origin of the operation. He explains that the ordinary artificial limb acts through the intermediation of the sound limb or the chest or of the upper segment of the amputated limb, acting as a whole, and that the remaining

muscles of the stump, so far from being utilized, are often a hindrance to the efficiency of the limb, as we have mentioned above when describing Muirhead Little's views. In 1899 many Italian soldiers were brutally mutilated by the Abyssinians, and Vanghetti, who is a physician, conceived the idea of utilizing the muscles of the stump and so relieving the sound limb from the restraint of its harness. Very few cases had been dealt with on these lines before this war, although Vanghetti's book appeared in 1906, and several

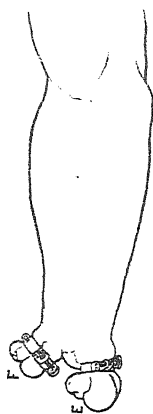
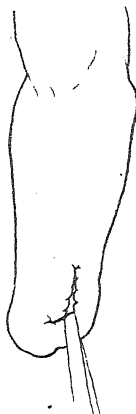


Fig. 13.—'Peg' motors and rings.



Figs. 14, 15.—'Loop' motors.

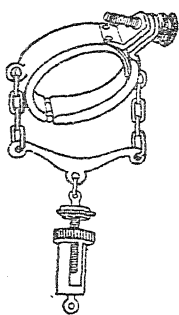


Fig. 16.—Hinged ring and connections.

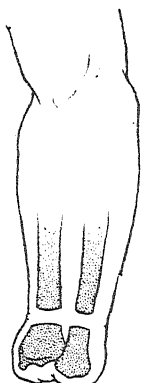


Fig. 17.—Formation of artificial joint in forearm.

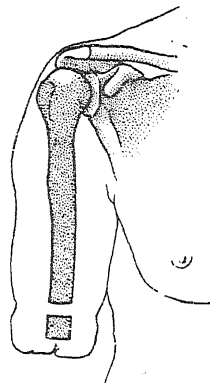


Fig. 18.—Formation of artificial joint in upper arm.

surgeons, notably Ceci, Elgart, Nagy, Korte, Payr, and Witzel, reported operations on these lines with only a modicum of success. Sauerbruch adopted Vanghetti's method early in the war, and in 1916 published a monograph on his results. Putti more recently has operated on a large number of cases, and some of his results will be mentioned later.

The main principles are these: The tendons or muscle masses, covered by suitably prepared skin flaps, serve as a means of conveying motion to the

prosthetic appliance, and are called plastic motors. They are of two kinds, namely, the clava or peg (*Fig. 13*) and the ansa or loop (*Fig. 14, 15*). The hinged ring of metal clamped to the plastic motor is shown in *Fig. 16*, and as applied to motors of the clava type in *Fig. 19*. With loop motors a similar appliance or a double hook may be used. Apparently the danger of troubles resulting from the friction of the various parts of the apparatus on the skin

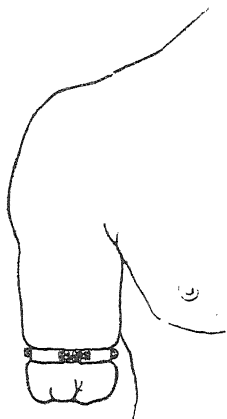


Fig. 19.—Hinged ring in position on artificial joint shown in *Fig. 18*.

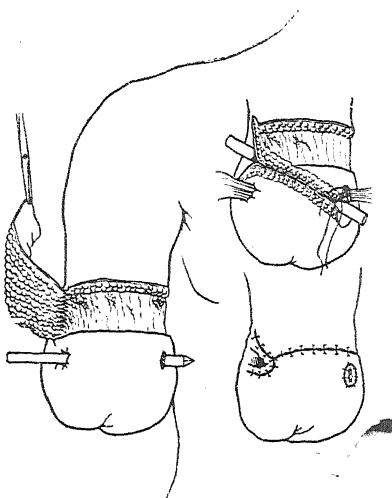


Fig. 20.—Tunnelization of upper arm stump (flexors only).

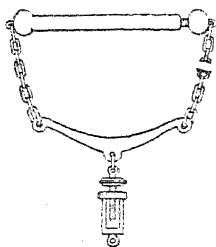


Fig. 21.—Rod and connections for tunnelization.

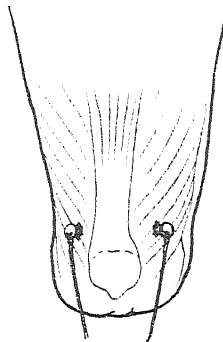
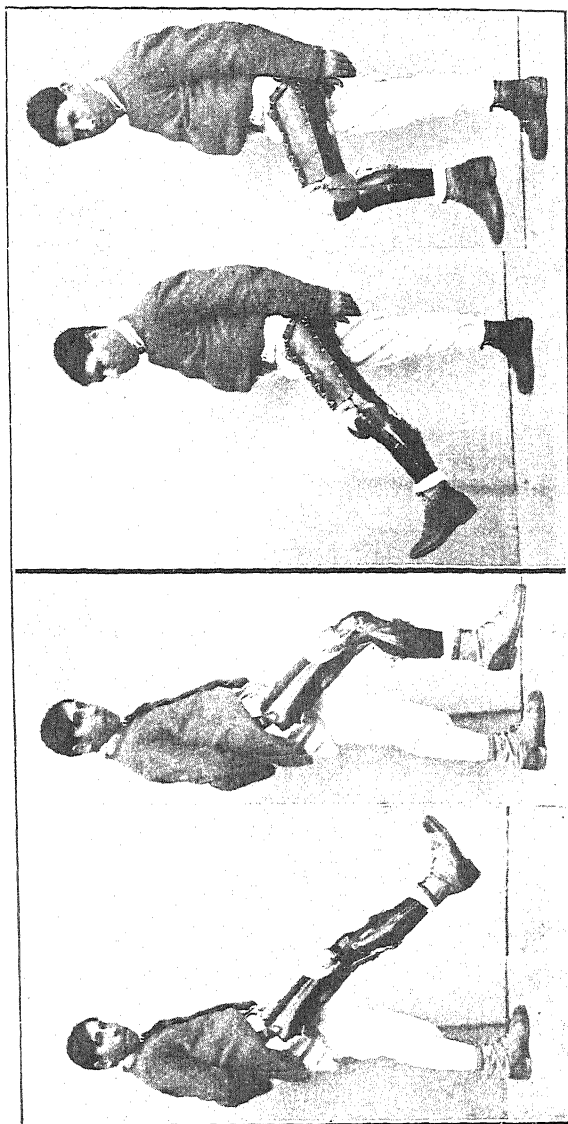


Fig. 22.—Tunnelization of quadriceps tendon. Rod in situ.

seem not to be serious; but it is pointed out that the range of movement can rarely be expected to equal the normal. The loop motors give a smaller range of movement than the peg type, and they are less adapted to movements in two directions, though in *Fig. 15* it is shown how this is occasionally possible. Sauerbruch has added the method called tunnelization, which consists in boring a passage through the limb at some suitable part and lining it with skin. *Figs. 20-22* illustrate how this is done. The writer of

PLATE VI.

THE KINEPLASTIC STUMP: VANGHETTI'S OPERATION



Kineplastization as applied by Prof. Puri to an amputation stump of the lower third of the thigh. Two patients are shown whom quadriceps kineplastization has enabled to control voluntary extension of the knee. The particular method here employed is a terminal tunnelized plastic motor or motor flap.

Kindly lent by 'The Lancet'.

the article¹¹ very rightly calls attention to the paucity of actual reports of the results of these operations, and states some of the practical difficulties. He considers that it is not of great value in the lower limb, but that it will have a distinct value in the upper limb.

Putti,¹² in explaining the technique of these operations, makes it clear that it is in the early stages that the necessary amount of bone, muscle, and skin must be conserved, so as to prepare the ground for these plastics, and that this must modify profoundly the treatment of cases that come to amputation. The motor flap must possess every requisite for a firm, painless grip, and must be provided with sufficient muscular power for the purposes for which it is intended. To make this possible, the motors must be covered with healthy, well-nourished skin of normal sensitiveness, and it must be so fashioned as to be adaptable to the various hooks, wings, and rods which are to transmit the movement to the limb. Tendons are in general to be preferred to muscle belly, and the latter may have to be tunneled to permit of the construction of extra-terminal motors. The antagonistic powers which are essential to satisfactory action of the motors may be obtained from the stump itself or from the artificial limb by means of elastic resistances. Where stiffness of joints exists or when it is otherwise desirable, it is useful to produce a false joint in the continuity of the limb, thus adding a leverage effect to the 'motor.' In *Plate VI* is shown one of the happiest results of this new type of operation, the patient being able to extend the knee actively, by means of the quadriceps. Putti also points out that the kineplastic method gives promise of great usefulness with the short below-elbow, below-knee, and below-wrist stumps, which up to now have been veritable stumbling-blocks to the artificial-limb maker. He considers that to be of practical value the 'motor' must be able to shorten at least 1 in., and in the case of the quadriceps he has obtained up to 2½ in. Putti admits that the intelligence of the patient is an important factor in the success of the case, and that even when a satisfactory surgical result has been achieved there still remains the equally important question of the prosthesis,

which of course must be designed on special lines. Putti is not prepared to pronounce a final judgement as to the ultimate scope and value of the method, for he admits that the number of cases is at present too small to admit of this.

Commenting on this paper the author of the special article in the *Lancet*¹³ mentions how important it is to educate the muscles forming the motor before the artificial limb is fitted, and shows how this may be attained (*Fig. 23*). He also illustrates the Stodola artificial hand, which has been found most satisfactory to use in combination with the kineplastic stump. It consists of a

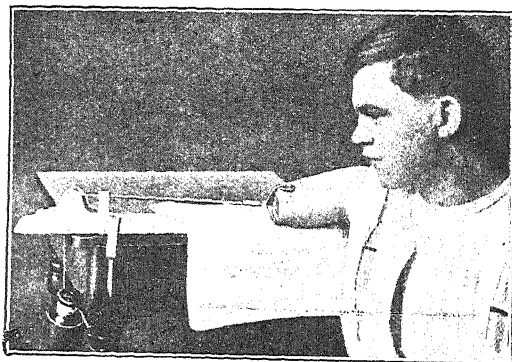


Fig. 23.—The kineplastic stump. Vanghetti's operation. Showing the method of training the muscles in a motor flap. The rod passing through the tunneled flap is attached by means of cord and pulley to a weight which can be varied as desired.

massive palm with five fingers, each in three parts. Tendons of wire are

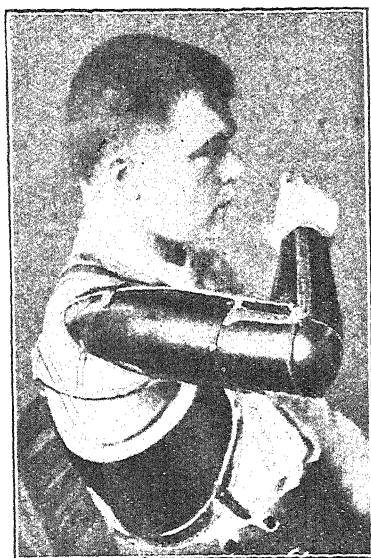


Fig. 24.—The kineplastic stump. Vanghetti's operation. Showing the adaptation of the com-prosthesis to an arm amputation stump 13 cms. in length. Forearm flexed, fingers extended.

same stump in order to obtain different movements in it. (2) Alternating or bimotors, capable of movement in two opposite directions, and formed by suturing the antagonistic muscles on the section of the bone or on the articular surface. He reviews the subject at length, and gives numerous illustrations. He differentiates between the primary kineplastic operations and those secondary ones which are done on stumps which, amputated by classical method, are found later to be suitable for a secondary subsequent kineplastic modification.

Stassen,¹⁰ in his introductory paper preceding a series of three papers in the

attached to the tips of the fingers, passing through them to the palm, where they are united to a rod provided with rollers at each end. A pull on the rod closes all the fingers, but if an uneven object is grasped the fingers accommodate themselves to it. The thumb is immovable and slightly extended, and objects can be pushed in between it and the fingers. The complete prosthesis is shown in Figs. 24, 25. A cord passes from the back of the shoulder girdle to the upper third of the forearm, and when the stump is raised this cord is shortened and the forearm flexed. The same effect can be produced by raising the shoulder. From the rod which passes through the canal in the muscle flap a wire passes to the artificial hand. A pull with the muscle closes the fingers, while a vigorous pull closes the fist. Much practice is required to learn to close the hand at the right moment to grasp an object.

Gaudiani¹⁴ divides the motors obtainable by these operations into: (1) Simple or unimotors that can execute movements in one direction only. A number may be used on the

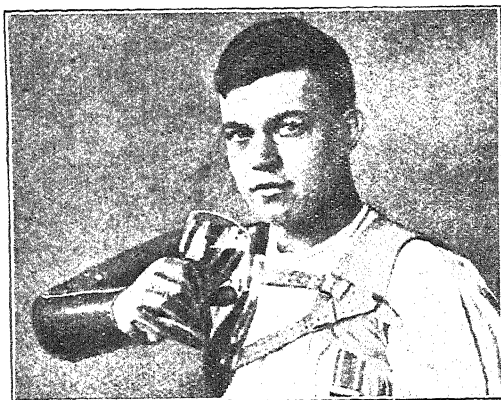


Fig. 25.—Same as Fig. 24. Forearm flexed, fingers flexed.
See also Fig. 18,

June number of the *Archives Médicales Belges* for 1918, urges closer co-operation between the surgeon and the instrument-maker in order to make these operations more frequently possible and to give better results.

Vanghetti¹⁵ explains the principles which form the basis of his method thus: In an amputation or disarticulation, whether recent or not, the tendons or the muscles, if provided with the necessary physiological desiderata (skin to cover them, a good blood-supply, and intact innervation), can as a rule serve for kinematization, if one is able to make an artificial point of attachment under conditions which secure the integrity of the tissues so employed. He adds the diagrammatic representation of the various devices which have up to now been employed in this type of operation (*Fig. 26*).

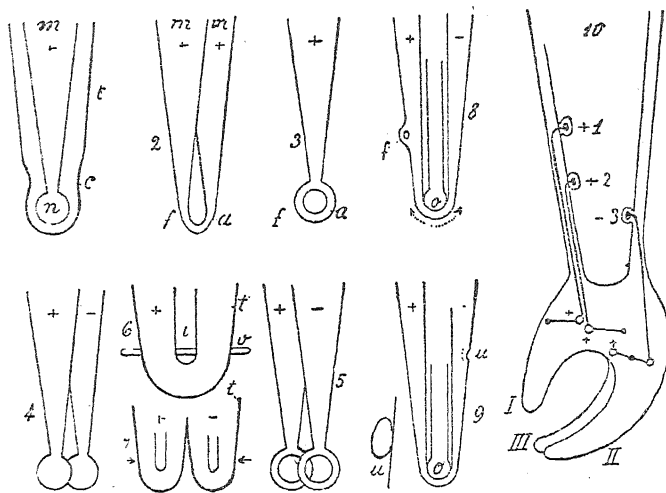


Fig. 26.—Diagram showing the devices used in Vanghetti's method. (+ - stand for the two opposed groups of muscles). 1, Single motor (muscle); 2, Loop motor; 3, Loop motor (one tendon only employed); 4, Double peg type; 5, Double loop; 6, Sauerbruch's tunnel; 7, Double tunnel; 8, Extra-terminal loop; 9, Tunnel; 10, Ideal hand.

Figs. 13-26.—ILLUSTRATING VANGHETTI'S OPERATION.

(By kind permission of the 'British Medical Journal'.)

Pieri¹⁶ reports his conclusions as to the best types of kineplastic operation to adopt at the various levels, and the technique to be employed, but he admits that these statements must be regarded as tentative in the absence of sufficient personal experience to permit finality of judgement. He believes that the free-loop type of motor is the most generally useful, but it is also the most difficult to prepare. For the arm and forearm he favours the formation of two loops—one for flexion, the other for extension. It is essential to have healthy skin to cover these loops. Pieri has found that it is not satisfactory as a rule to attempt to perform these operations in primary amputations in war (*primary kinematization*), but that it is preferable to make provision for a *secondary kinematization*, by doing what he calls a hypokinematic operation. With this object he advises the most careful preservation of all skin, ignoring in so doing all ideas of symmetry, and using few, if any, skin sutures. As soon as all inflammation has subsided, the soft parts must be put under extension so as to avoid retraction of both skin and muscles.

Shoulder.—Here it is generally possible to conserve the deltoid and the pectoralis major, with a view to their subsequent use in forming either pegs or loops.

Arm.—At the middle or lower thirds of the arm, if the amputation can be made a transverse one, then, by means of two strapping extensions, it is possible to make provision for the preservation of both the flexors and the extensors by means of a bimotor; if, on the other hand, it is only possible to make an oblique amputation, then it will generally be possible to make either a modified bimotor or a unimotor.

Elbow.—Pieri has had no actual experience of these, but says that the biceps and the triceps will make extremely powerful bimotores.

Forearm.—Here the particular level and direction of the amputation must have an influence on the type of operation. He recommends that the flexor and extensor groups should be dissected up freely from the underlying bones by means of incisions at the inner and outer sides of the forearm, and should the axis of the cut surface be oblique it may be necessary to sacrifice a little bone as well. The lateral incisions enable the surgeon to enwrap the mass of muscles and tendons in skin, at least partially. As soon as danger of sepsis is past, apply the extension to the stump, and put on a provisional apparatus to exercise the two motors and to prepare for the final prosthesis. By this means it will be possible to obtain two motors, equal in length if the surface of the stump was originally transverse, unequal if the surface was oblique. Pieri warns against sacrificing the shortest forearm stump, as he says that the brachialis anticus and the triceps will make a very satisfactory kineplastic stump.

Hand.—It is difficult here, he says, to lay down any hard-and-fast rules because of the variety of stumps met with. As a rule the flexor longus pollicis is saveable, together with the extensor carpi radialis, longior and brevior, and the flexor and extensor carpi ulnaris, with as much of the other tendons as possible. When the smallest piece of the proximal phalanx of the thumb is left it must be conserved, and the flexors and extensors utilized to form motors.

Tertiary Kinematization.—This name is given by Pieri¹⁸ to operations on stumps already healed and which have been conducted on formal lines. It may be possible to obtain a certain degree of success by means of a band round the limb just proximal to its distal end; the contractions of the muscles of the stump may be able to displace the band in the desired directions (method of Stropeni). A more efficient method is that of Francesco, who divides or resects the bone at a short distance above the end of the stump. Best of all, according to Pieri, is the resection of the bone end and the formation of a loop motor covered by the skin which is obtained as a result of the bone sacrificed. In general, Pieri prefers for the arm and forearm the two-peg method capable of being converted into a loop, while he quotes Putti, Ceci, and Sauerbruch as preferring the complete loop. To convert the mass of muscles at the end of the stump into a loop is a delicate matter, and the devices have been numerous. Sauerbruch and De Francesco have tried to get an epithelialized channel by the use of rods of metal, etc., left in for a considerable time, but this is not satisfactory. Ceci and Putti have tucked in the skin from the end of the stump, while Sauerbruch, by a somewhat elaborate technique, has made a tube of skin with its epithelialized surface inside, taken either from the neighbourhood (and therefore pedicled near the end of the stump), or by means of the Italian type of graft. He quotes von Wreden as having made a lateral loop by isolating a piece of muscle and covering it with skin. Pieri considers that the ordinary stump has certain features which lend themselves to kinematization, for there are often ready-made loops, as it were, between muscles,

the result of adhesion during healing, and he warns against following Sauerbruch's advice to excise all scar tissue lest this valuable feature be lost. Pieri recommends that this tertiary kinematization should not be unduly delayed, as the muscles at the end of a stump will become rapidly useless from atrophy if not used; but quotes De Francesco as having exceptionally obtained a good result after five years. He also advises trying to do what is necessary at one sitting rather than subject the patient to many operations which, as he says, they are ill able and ill prepared to put up with.

The following are the methods which he recommends for these tertiary kinematizations:

Shoulder.—For disarticulations at the joint he prefers a loop motor, utilizing the muscles of the shoulder girdle and obtaining the skin covering from the chest wall.

Arm.—If the amputation is high up, a large single terminal loop can be formed, and the resection of a part of the scapula will provide space to form a tunnel if necessary. If the stump is longer, a flexion-extension loop can be fashioned from the biceps and triceps, while in certain cases the deltoid can be made to afford a secondary loop. At the lower third the technique described for secondary kinematization at this level may be utilized, and the classical stumps afford a satisfactory basis for the flexion-extension terminal loop. Sauerbruch makes the two pegs at these levels, and converts them into a loop at a second intervention. If a funnel-shaped end to the stump has been achieved as a result of traction, it is very satisfactory to make two loops, one from the biceps mass and the other from the triceps.

Forearm.—For ordinary stumps, resection of a part of the lower ends of the radius and the ulna frees sufficient tissue to form loops or pegs. If the stump follows a so-called hypokinematic method of amputation, the musculotendinous masses may as a rule be easily tunnelized with or without the help of a preliminary resection of the ends of the bones.

Hand.—Here precise rules are impossible and the number of cases is small, but Pieri indicates that where there is little of the proximal phalanx of the thumb left it may be possible to utilize the metacarpal, and convert a short into a long and more useful thumb by making a deep groove in the interdigital space.

Kinematic Amputation of the Lower Limb.—There are two points to bear in mind in this connection: The possibility of increasing the weight-bearing capacity of the limb, and the replacing of the movements of the latter. In the middle and lower parts of the thigh, Pieri has cut the femur with a smooth convex surface, which he then covered with a pedicled flap of fascia lata, finishing by the formation of a loop made from the quadriceps and the hamstrings. Putti, after a disarticulation at the knee, fixed the tendon of the quadriceps to the flexors preserving the patella, and in a later case he made the bone section through the condyles, and made a Sauerbruch tunnel under the lower end of the quadriceps, with an excellent result.

At the lower part of the leg, Pieri prepares an antero-external flap, which comprises all the available skin with the muscles and aponeuroses, and these are then sutured to the flexors at the *inner* margin of the stump, while he covers the tendo Achillis with skin from the back of the leg; this is then either made to act as a peg motor, or by uniting it to the tibialis anticus it is possible to make a loop motor. At the ankle region Codivilla has obtained good results by making a loop from the extensors, and a peg from the tendo Achillis and a portion of the os calcis. Pieri has cut off the malleoli at the level of the joint and used the remainder of the articular surface for the loop to glide over made from the flexors and extensors. Even in disarticulation

at the hip, Pieri concludes that it may be possible to prepare a satisfactory kinematic stump from the remains of the glutei and the psoas.

Pellegrini¹⁷ has devised a series of ingenious devices to enable the extra-terminal type of loop motor to be used more frequently, in 'tertiary kinematizations' particularly. As he points out, the manufacture of the tunnel has great difficulties when the Sauerbruch method is adopted, because the long skin flap used has often a poor blood-supply, and therefore may slough wholly or partly. To avoid this he makes parallel incisions at right angles to the axis of the limb at a convenient distance from the end of the stump; the skin is

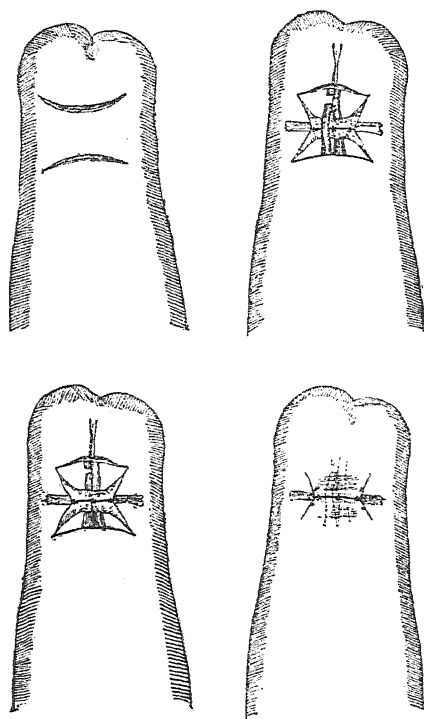
then undermined between the incisions, and is made into a tube by suturing over a piece of tubing. At the same time the tendons or the muscles are made to form a loop *in situ* over the skin tube, a reversal of the ordinary method as it were. A series of excellent diagrams illustrate this paper (see Figs. 27-30).

Neve¹⁸ gives a short *résumé* of his methods for *re-amputation*, in which he recommends the free use of relaxation sutures to obviate tension, and he sutures the periosteal sleeve left after the bone resection over the ends of the bone.

Bassetta,¹⁹ in recommending the use of *elastic traction* after amputation, to prevent retraction of muscles and skin, gives a description of his methods of ambulatory traction, and advocates this whenever feasible.

Desfosses²⁰ reviews the *after-treatment of stumps*. He says that the limb should be placed in such a position that should ankylosis follow it should be in the most favourable position, but that to avoid the danger of ankylosis the joints of the stump should be moved as often as possible.

Desfosses gives details of the various types of extension to be used in the various stumps. This author is an advocate of the provisional artificial leg or 'pylon' made of cardboard, linoleum, or of plaster and wood, even before the stump has healed. In searching for the cause of painful stumps, Desfosses urges the necessity of x-ray examinations, thus revealing unsuspected sequestra, osteomyelitis, etc. The painful stumps due to nerve involvement are due to two types of lesion, this author says, following Tuffier. In the first the painful spot is localized, and it must be treated by careful excision of the affected nerve bulb, while in the other type the pain is more generalized, and the correct procedure in this case is to resect the nerve freely at the site of the maximum pain.



Figs. 27-30.—Pellegrini's method in 'tertiary kinematization.' Reproduced from the 'Archives Médicales Belges.'

Louvard²¹ deals with the subject of the provisional prosthesis or the pylon. He mentions the disastrous results of the prolonged immobilization which is so common after amputation, and affirms that every stump should undergo physical exercises, as soon as the danger of serious sepsis has passed, and the object of a pylon is to make this possible. To do this it is evident that the end of the stump, still tender or even unhealed, must not reach the end of the pylon socket, since it is neither necessary nor desirable—the stump is required to act as a lever, not as a weight-bearer. These provisional limbs have been devised and perfected by Martin, Petit, and Andriiu.

Pylon for the Thigh.—Material required: (1) 2 to 4 plaster bandages, 9 yds. long and 5 in. wide. (2) A discarded crutch, or the equivalent in the form of a couple of uprights and a cross-bar; one of the uprights must be the length of the sound limb measured from the upper level of the great trochanter; the other reaches to within an inch of the crotch. The outer faces of these uprights are notched at the upper ends. (3) A piece of hoop-iron $\frac{1}{2}$ in. thick, 6 in. by $\frac{3}{4}$ in., at one end of which a hook is made by cutting and turning back a portion about $\frac{1}{2}$ in. from the end. (4) About 4 in. square of malleable metal sheet. (5) Two U-shaped attachments made of medium galvanized wire. (6) Braces and a belt made of elastic material.

Technique.—The patient is made to lie down, with the pelvis on a support, and a pad to support the head and shoulders and a narrow one for the sound tuber ischii. The sound leg gives another point of support during the next stages. The stump is shaved and vaselined, and held slightly abducted. The stump is now covered with turns of plaster bandage, in a spiral from below upwards but leaving the end free. The great trochanter, the groin, the tuber ischii, and as much as possible of the sacrum, are covered, and finally the waist is taken in by three spiral turns of the bandage. The malleable metal square is moulded over the tuber ischii and incorporated in the plaster to strengthen it at this place. The two side pieces are now applied, the longer outside and the shorter on the inside, stretching to within an inch of the groin, and the uprights are then included in the whole by turns of the plaster bandage, and the cross-piece previously fixed in position keeps them apart. The piece of hoop-iron is placed against the posterior border of the outer upright, with its hook corresponding to the posterior border of the great trochanter. With an aniline pencil a line is drawn, one finger's breadth above the great trochanter, passing $\frac{1}{2}$ in. above the fold of the groin, then backwards, well above the tuber ischii back to the point whence it started. The bandage round the waist is cut before the plaster is set, and the apparatus is gently eased away and removed. The plaster is now cut at the line traced on it, and the cut edge is made smooth by a thin paste of plaster. The pylon is then allowed to dry thoroughly, and the end of the wood furnished with a piece of rubber for walking. The two U-pieces are then made to take a bite of the plaster at an inch from its margin in front and behind. The patient stands up to put the pylon on, and by means of the elastic brace over the sound shoulder it is supported, the lower end of the brace being attached to the two U-pieces in the plaster. An elastic belt is then applied, and this gives support to the apparatus and prevents rotation by means of the hook behind the trochanter, to which the belt is attached. Similar appliances are described by Louvard for the leg, arm, and forearm, as shown in *Figs. 31–34*.

Broad²² describes a pylon made of papier-mâché, which can be remoulded or broken up as may be necessary, and he also pads the floor of the bucket so that the end of the stump is subjected to graduated pressure. An accurate cast of the stump is taken, and on to the mould so prepared a layer of felt is sewn; on to this a layer of papier-mâché, $\frac{1}{8}$ in., is placed. A wooden base is

fixed to the floor of the bucket so formed, and the latter is reinforced by four light metal bars, which are welded at their lower ends into a tube. (Figs. 35-38.)

Martin²³ takes serious exception to the statements of Broca and others that these pylons cause the lighting up of inflammatory foci in the stump, for he affirms that it is unknown in his large experience at 'Océan.' He claims that the pylon is an apparatus of great economic as well as surgical

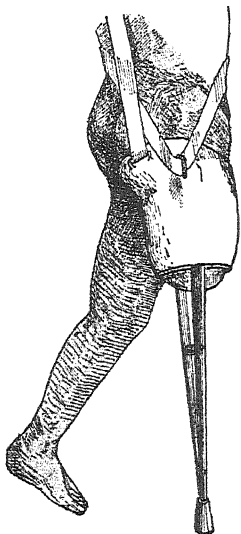


Fig. 31.

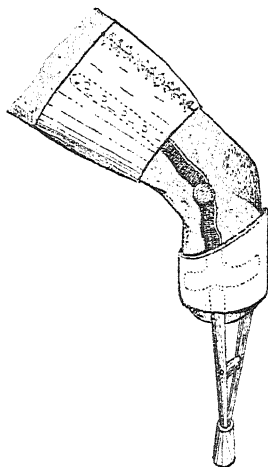


Fig. 32.

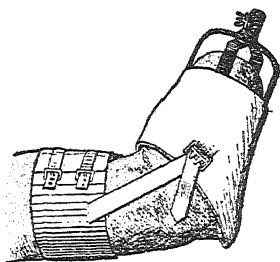


Fig. 33.

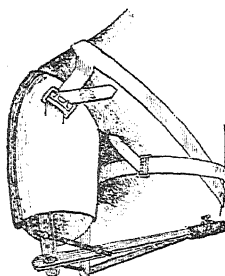


Fig. 34.

Figs. 31-34.—Louvard's prosthetic appliances in amputation of thigh, leg, forearm, and arm.
(From the 'Presse Médicale'.)

value, since it avoids the waste of money inevitable in a good many cases treated without it, in which the artificial limb has often to be discarded after a short time, owing to the alterations in the stump, whereas by the use of one or more pylons, which are extremely cheap, the patient can be accommodated until the stump has reached a stage when a final prosthesis can be fitted without fear of subsequent changes. Martin supports the plaster pylon because the wooden socket often does not fit accurately, and in that case the stump

undergoes irregular atrophy. Recently he and his associates have made provisional prosthesis for the upper limb, because, as he says, the result of neglect to exercise the upper limb is even more serious from an economic point of

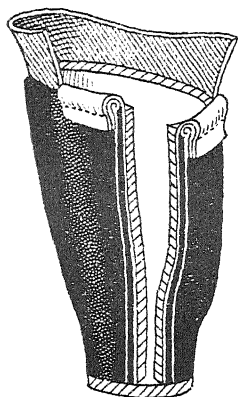


Fig. 35.—Cast covered with felt and papier-mâché.

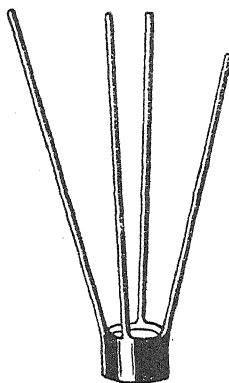


Fig. 36.—Metal rods which support the papier-mâché.

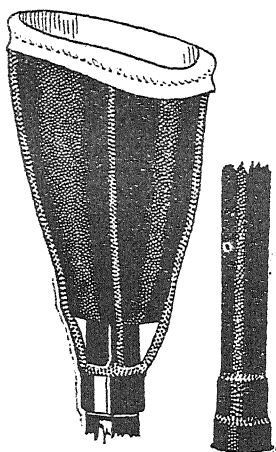


Fig. 37.—Complete pylon (for thigh stump).

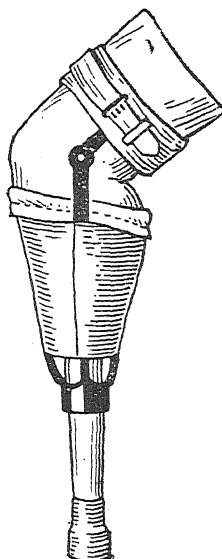


Fig. 38.—Pylon for leg with knee hinge.

Figs. 35-38.—Captain Broad's pylon, or temporary artificial leg. (Redrawn from the 'British Medical Journal'.)

view than with the lower. Martin starts graduated exercises in his arm and forearm cases ten to thirty days after the healing of the wound, and gives them a provisional apparatus. It is essential that the patient should not be

fatigued by the work he is allotted. At first he is set to file a piece of iron with a medium file; later a heavy coarse file is substituted. If the stump shows any degree of stiffness in any of the joints, sawing with a two-handed saw is recommended by this author; one of the patients in an advanced stage of cure guides the saw for the other, and thus the latter gets a sort of passive movement of his stiff stump, while he quickly gets to the stage of active use of the limb as he grows interested in the work. After the stump is sufficiently hardened, wood-carving with mallet and gouge is begun. He maintains that walking and working are the essential elements in the physico-therapy of amputations, and in choosing the nature of the work he is in favour of careful grouping of the patients so as to educate them if possible along the lines of their former trades. He concludes by expressing the opinion that in performing amputations during the war we have been too much influenced by time-honoured and classical conventions, and that there has been too often a sacrifice of valuable tissue.

REFERENCES.—¹*Brit. Med. Jour.* 1917, ii, 550; ²*Ibid.* 1918, ii, 158; ³*Zeits. f. Orth. Chir.* xxvi, 1916; ⁴*Lancet*, 1918, i, 706; ⁵*Jour. Amer. Med. Assoc.* 1918, ii, 271; ⁶*Rev. de Chir.* 1918, Jan.-Feb., 104; ⁷*Lyon Chir.* 1917, 591; ⁸*Rev. de Chir.* 1917, Mar.-April, 373; ⁹*Jour. Amer. Med. Assoc.* 1918, i; ¹⁰*Archives Méd. Belges*, 1918, June, 657; ¹¹*Brit. Med. Jour.* 1918, ii, 63; ¹²*Lancet*, 1918, i, 791; ¹³*Ibid.* 818; ¹⁴*Ann. Surg.* 1918, April, 414; ¹⁵*Archives Méd. Belges*, 1918, 663; ¹⁶*Ibid.* 688; ¹⁷*Ibid.* 675; ¹⁸*Brit. Med. Jour.* 1917, ii, 583; ¹⁹*Archiv. di Ortoped.* 1916-1917; ²⁰*Presse Méd.* 1918, June 10, 290; ²¹*Ibid.* 1918, June 27, 331; ²²*Brit. Med. Jour.* 1918, i, 453; ²³*Archives Méd. Belges*, 1918, April, 428.

ANÆMIA IN INFANTS.

Frederick Langmead, M.D., F.R.C.P.

TREATMENT.—Kerley¹ reports several cases of secondary anæmia treated by Blood Transfusion. Various foods had been tried, and all the patients had received medical treatment for the anæmia. The blood of the donor was tested for agglutination and hæmolysis. The technique is thus described: The skin over the median basilic vein was cleaned and cocainized. An incision was then made, and about 2 cm. of the vein exposed and dissected free from surrounding tissues. A small opening was made into one side of it with a pair of scissors, and a Lindemann needle inserted. The vein below the needle was then tied off and another suture placed over the vein to hold the needle in place. A small amount of salt solution having been introduced to make sure there was no leakage, a rubber tourniquet was placed on the arm of the donor and the skin cleansed over the most prominent vein. The exploratory needle was inserted directly into the vein and the blood withdrawn into a Record syringe until it was full. The syringe was then handed to the operator working on the child, and the blood inserted into the patient's vein; at the same time a fresh syringe of blood was being obtained from the donor. Each syringe was well washed out with sterile salt solution before being used again to collect blood. The procedure was continued until the required amount had been transfused.

One case was transfused twice, and in each instance there was an improvement as shown by blood-examination, but it failed to persist longer than a few weeks. The abdomen was greatly distended, not unlike that of Hirschsprung's disease, and general improvement was not satisfactory. In the other cases there was no return of the anæmia, and subsequent growth and development was all that could be wished. In 2 cases, in addition to the anæmia there was extreme malnutrition. One infant was very weak and exhausted and had developed petechial hæmorrhages; several weeks of treatment were required to bring her to a fairly normal state. In one case the patient was a very anæmic twin child and had failed to grow in spite of careful dieting; she made a prompt and rapid response to transfusion. The lowest red-corpuscle count

in the series before transfusion was 1,600,000, which rose to 4,000,000 twenty-four hours after, and at the end of seven months was 4,800,000. The improvement in the blood and in the weight was accompanied by a marked change in the patients from sickly whining infants to happy and apparently healthy babies. (See also BLOOD TRANSFUSION, p. 9.)

REFERENCE.—¹*Amer. Jour. Dis. Child.* 1917, Dec. (in *Ther. Gaz.* 1918, May 15, 355).

ANÆMIA, PERNICIOUS.

Herbert French, M.D., F.R.C.P.

The treatment of pernicious anæmia is still as little successful as it was years ago, notwithstanding the serious and extensive steps that have been taken to deal with the malady by new methods, notably by splenectomy, or by transfusion of human blood from a healthy donor, or by both these methods. Arsenic by the mouth, or in the form of intravenous injections of 606 or one of its equivalents, still gives the best results, taking cases all the way round, although here and there amongst a large number the immediate benefits of transfusion or of splenectomy have been so striking that one's hopes of benefiting all cases by this procedure have been raised. It is, however, only here and there that a case treated by splenectomy or by transfusion benefits any more markedly than a corresponding case treated by arsenic or by 606; and when one studies a considerable series of consecutive cases, one finds that although temporary improvement may be brought about by this procedure in many, in many others there is hardly any improvement at all, or at any rate no more benefit in the way of a remission than can usually be produced by arsenic; and the ultimate result is much the same in either case—the patient's actual length of life being but little prolonged. Bloomfield,¹ for example, analyzes the results in a considerable number of cases, 26 of which were treated by transfusion, 8 by splenectomy, and 28 by the older arsenical methods. He summarizes the results carefully, and finds that there is no definite evidence that either transfusion, splenectomy, or elimination of foci of infection prolongs the life of patients suffering from pernicious anæmia. He finds that Transfusion may be followed by remission in about half the cases so treated, raising the blood-count to a higher level than it reaches in similar cases not so treated; but that the plethora so produced does not increase the duration of the remission, although the patients have a sense of well-being while the blood-count is high. In patients treated by Splenectomy, the clinical course of the case appeared to be altered not at all, and although the splenectomy was followed by remission of the anæmia temporarily, the duration of this remission was no longer than is generally the case with patients treated by arsenic and no splenectomy. Bloomfield goes so far as to say that the evidence of his cases does not even point to transfusion being of any pronounced value as an emergency measure in extreme cases by way of tiding the patients over an unusually severe relapse.

It is only right to point out, however, that there are others who advocate both Splenectomy and Transfusion with considerable enthusiasm. Minot and Lee² are amongst these; but their paper, which should be consulted *in extenso*, does not convince one. They advise that the transfusions should be repeated, and be begun relatively early in the disease, instead of being resorted to only when the patient has an already very low blood-count. But when one considers the expense and trouble of such repeated transfusions in addition to splenectomy, one feels that the results need to be much more encouraging than they have proved up to the present before one is justified in urging strongly this line of treatment in preference to arsenic and 606.

REFERENCES.—¹*Johns Hop. Hosp. Bull.* 1918, May, 101; ²*Boston Med. and Surg. Jour.* 1917, ii, 761.

ANÆSTHETICS.

J. Blomfield, M.D.

In a good general article on anæsthetics, T. L. Dagg¹ classifies preventable deaths, which he considers to be of large number, into those due: (1) To the drug *per se*; (2) To its faulty administration; (3) To pathological or physiological causes in the patient. He lays stress upon the importance of proper preparation, and prefers gas and oxygen to all other anæsthetics whenever possible.

He deals in detail with the technique of *rectal anæsthesia*. The amount of time required over the last is a bar to its routine use in hospital work unless cases can be entrusted to assistants or nurses until the moment of operation, which is obviously difficult, seeing that all the important steps are taken prior to this. Dagg gives an aperient the night before, and the enema four hours before operation. Two hours later the colon is washed out. One hour before operation morphia and atropine are injected hypodermically. Scopolamine is used sometimes, but not as a routine. Forty-five minutes later the oil-ether is introduced per rectum, 2 oz. of olive or cotton-seed oil to 6 oz. of ether, thoroughly shaken up together. For introduction, a soft rubber catheter is inserted five inches up the rectum, and the mixture run in at the rate of an ounce a minute. One ounce of oil-ether is used per 20 lb. of body weight of patient, 8 oz. being the maximum amount to be introduced. In about half the cases short inhalations of ether are required to get over the excitement stage. When operation is over, a tube is inserted up to ten inches, the colon massaged, and the bowel washed out with plain water. Two to 4 oz. of olive oil are put in and retained, and the patient is put to bed. Rectal irritation or bleeding has not been met with.

The rectal method is warmly extolled for all gastric cases.² The preliminary steps recommended differ somewhat from the above, for one hour before operation there is given: Paraldehyde 2 dr., ether 2 dr., olive oil 1 dr. Twenty minutes later morphia and urotropine are injected hypodermically, and after another twenty minutes: Ether 3 oz., olive oil 1 oz. The writer points out that this ether-oil mixture has been shown experimentally to kill *B. coli* in one minute; consequently its use has a prophylactic effect as regards sepsis.

Several Russian surgeons³ record their experiences of rectal anæsthesia. The general opinion is that it has great advantages in cases of operation upon the head and neck, but that just as much care must be exercised to prevent mechanical obstruction in the upper air passages as in inhalation anæsthesia. Instances of fatalities are given, but in no case is it clear that the method could be incriminated.

Dealing with *anæsthetics in orthopædic surgery*, Walter Elmer⁴ states the advisability of light narcosis for this branch of work. He rules out chloroform as a routine anæsthetic; this should be nitrous oxide and oxygen in most cases, otherwise ether. The latter he prefers to use unpreceded by morphia. This author makes some pertinent remarks upon the responsibility of the anæsthetist, and upon the necessity for specially skilled administrations, and for the proper information as to the patient's condition and proposed operation being supplied to the anæsthetist beforehand.

The fact that insensibility to pain, even if not surgical anæsthesia, can be obtained by *swallowing anæsthetic drugs* has been made use of in the frequent cases of painful dressing that arise in war surgery.⁵ The authors state that "general analgesia, with or without loss of consciousness, can be established for otherwise painful dressings and for short operations." Obviously there is great advantage in being able to induce analgesia for a painful dressing without employing special apparatus or moving the patient from his bed. The method

has been arrived at subsequently to experiments upon animals, details of which are provided. The combinations tried clinically were as follows:—

R Ether			Aq. Ment. Pip.	℥v
Liq. Paraffin	āā	3iv		
R Paraldehyde		3j	Aq. Ment. Pip.	℥v
50 per cent Ether in Albolene				
	q.s.	ad 3j		
R Ether		3iiss	Aq. Ment. Pip.	℥v
Albolene		3iv		

The mixtures containing paraldehyde were disagreeable to taste and smell, but by sandwiching the dose between mouthfuls of port wine this was overcome. Paraldehyde was, however, found unnecessary, and was abandoned. No special preparation is needed, but the analgesic is best taken not directly after a meal. Later this formula was used with success:—

R Chloroform	3ss	Ether	
		Liq. Paraffin	āā 3iiss

The oil and the ether mix perfectly and do not separate into layers. The total amount given is not absorbed at one time, for if it were, the administration of 2 oz. of 50 per cent ether in oil, as has occurred in practice, would produce anæsthesia by the liberation of 1 oz. of ether. Only a light analgesia is actually produced, which for operations must be supplemented by inhalation or otherwise. The safety of the procedure is apparent, for, as the authors say, "all anæsthetics are analgesics, and before the danger zone is reached the patient must become anæsthetized; hence the patient in the analgesic stage is separated from the danger zone by the period of anæsthesia." Analgesia by this method is safer than any method of anæsthesia. If the anæsthetist carries his patient to the snoring stage, he defeats the object for which this special method was devised.

Numerous other contributions to the literature of anæsthesia during the past year deal with the special demands of war surgery. The use of *spinal analgesia*, the disappointing nature of which in shock cases⁶ was pointed out some time ago, is similarly deprecated by French writers,⁷ and its particular advantage in war surgery as opposed to ordinary practice appears to be the possibility it affords for single-handed anæsthetizing and operating in times of great stress and limited personnel. The elimination of stovaine has been the subject of experimental research.⁸ Its elimination through the urine is complete in nine hours, the average time being between six and a half and eight hours. The writer maintains that the reputation of stovaine for causing shock is unjustifiable. In 40 cases in which blood-pressure readings were taken every five minutes during operation and every four hours during the following twenty-four, the findings were: (1) In 35 cases the arterial pressure present before anæsthesia was maintained; (2) In 3 cases there was lowering down to 20 mm. below the minimum pressure; (3) Spinal analgesia could not be considered responsible in 2 very serious cases in which the process of shock continued to evolve in spite of all cardiac stimulants. Among the 40 cases, "many were already in a condition of shock." This writer concludes, contrary to general opinion, that "spinal analgesia enabled severely shocked patients to be operated upon."

For a very large proportion of such operations as are performed at base hospitals and at home—cases mainly of bone injuries—nitrous oxide and oxygen, supported when necessary by small additions of ether, is the best anæsthetic. Numerous forms of apparatus⁹ have been evolved to increase the mechanical facilities of administration and in order to give the gases warmed¹⁰. For

feeble patients, such as those ill from long-continued septic absorption, nitrous oxide is less injurious than any other anæsthetic; moreover it is just in such persons that its comparatively poor power to produce muscular relaxation is no obstacle to its use, for the muscular resistance in such patients is of the slightest. For a discussion on the whole subject of anæsthetics in military hospitals the reader is referred to the *Proceedings of the Royal Society of Medicine*.¹¹

The Anæsthetic Principle in Ether.—An article upon anæsthesia from commercial ether¹² contains statements which, if proved correct, must alter our usual conceptions of ether action. The research on which these conclusions are based was undertaken in order to discover the cause of an unusual odour from certain cases of ether. The laboratory chemical findings were checked by clinical observation, and it was recognized that of the different derivatives from the ethers examined, some were irritative, some anæsthetic, and some toxic. The irritative impurities acted either on the front parts of the nasal cavities, when they were alcohols or acetones, or on the nasopharynx and bronchi, in which case they were aldehydes. Aldehydes can irritate in an ether dilution of less than 1 per cent, and it is possible that they may be concerned in the causation of pneumonia. The objectionable odours of commercial ethers are mostly due to organic acids. The anæsthetic derivatives of ethers are: (1) Narcotics—producing peripheral congestion and drunkenness; (2) Analgesics—producing loss of sensation and peripheral vasomotor spasm. Absolute di-ethyl ether will not anæsthetize. Its administration produces peripheral congestion and drunkenness. Prolonged inhalation causes muscular tremor, shortness of breath with expiratory grunt, a terrible sense of impending danger, and increased congestion. As much as 20 oz. have been administered to one patient with no other effect. If, however, a small amount of carbon dioxide be present, the congestion is relieved and the patient enters the analgesic and anæsthetic states. In order to obtain anæsthesia we must have a narcotic such as di-ethyl ether acting with an analgesic such as carbon dioxide. Carbon-dioxide absolute-ether anæsthesia is a type of its own, is similar to that obtained from nitrous oxide, and admits of an almost equally rapid recovery. In practice it was found convenient to administer the carbon dioxide in solution with ether. Other narcotic substances occurring in commercial ether and acting in the same way as di-ethyl ether are: (1) Alcohol, 2 to 5 per cent; (2) Dimethyl ether; (3) Methyl-ethyl ether; (4) Methyl-propyl ether; the last three only in ethers from methylated alcohols. The ethers on the market do not generally contain enough carbon dioxide to act as an analgesic, so a further substance of similar nature was sought. It was found that absolute di-ethyl ether on being passed through a certain process developed analgesic properties. It then allowed patients to undergo even major operations whilst they were still able to articulate clearly and were not sleepy. Its odour was found to be sweeter than that of ordinary pure ether. The symptoms were carefully studied in over two hundred cases. In one case twenty-six of these administrations were conducted, each lasting not less than fifteen to twenty minutes. On no occasion was the patient nauseated, even though food had been taken recently. This patient relates her subjective experiences.¹² Extraction of gases from this product showed the presence of a gas with properties similar to those of ethylene ($\text{CH}_2=\text{CH}_2$), and another gas not yet synthesized. This ethylene must have developed in the process to which the ether was subjected. Ethylene was then manufactured and added to absolute ether, when a similar analgesic product to that described was obtained. It is reasonable to believe that ethylene is one of the analgesic substances searched for. In order that ether-ethylene solution should demonstrate the described results, the ether

must be absolute before ethylene is added. The writer states that this secret of ether anæsthesia has not been revealed before because processes to obtain pure ether have not hitherto been originated. Analyses of every ether on the market show traces of ethylene, and it is its concentration upon which the anæsthetic power depends. If it is present in sufficient quantity in an ether, the patient can be caused to lose all sensation before being made drunk by the narcotic solvents. "That is, it is now possible with this knowledge to control sensation as well as narcosis."

Intratracheal insufflation, which has proved so valuable a method in the frequent war operations for facial damage and deformity, has in this country been almost entirely limited to ether. Dr. Guizez¹³ has been using chloroform with success. Unfortunately his paper gives no details that allow one to ascertain the strength of vapour administered, nor does he hint at any possible dangers from the use of chloroform in this way, dangers that made their approach so obvious on the few occasions it has been tried in the present writer's knowledge. Most interesting and suggestive, however, are Guizez's results with regard to post-anæsthetic sickness. In 350 cases this occurred only 6 times, and then but slightly. This almost complete absence of vomiting after intratracheal anesthesia has struck others too, but the explanation has not hitherto been put forward. It is, according to the French writer, that, owing to the complete packing of the pharynx and presence of the tube, no swallowing movements were possible on the patient's part. Thus no saliva impregnated with chloroform, no mucus, and no chloroform vapour can be swallowed, and it is these, especially the last, that Guizez holds responsible for post-chloroform vomiting. A record of 37 cases with chloroform by Fairlie¹⁴ is of importance, because some of them were abdominal, whereas the French cases referred to above were all of head and neck operation, in which, even under ordinary circumstances, anæsthesia is not much followed by vomiting.

The administration of anæsthetics for operations on the face and neck, which have increased so enormously owing to war injuries, has been the source of many articles.¹⁵⁻¹⁸ Rockey describes his method in detail, which is an adaptation of Crile's well-known device for giving ether from a funnel through a nasal or mouth tube. The object aimed at is to achieve anæsthetic efficiency without endangering the surgical cleanliness of the neighbourhood, and the results depend largely on efficient antiseptic packing of the pharynx and posterior nares. Sandford recommends the use of *Anæsthohol*, which is a combination of ethyl chloride 17 per cent, chloroform 35.89 per cent, and ether 47.1 per cent. He induces anæsthesia with nitrous oxide and oxygen.

The comparative efficiency of local anæsthetics has been subjected to experimental estimation.¹⁹ The clinical desirability of a local anæsthetic is determined by its anæsthetic efficiency, and by its freedom from local irritation and from systemic toxicity. The writer points out fallacies in the usual method of seeking to determine systemic toxicity by hypodermic injection into guinea-pigs. He divides the problem, and in the present paper describes only attempts to determine anæsthetic efficiency, leaving aside the question of local or systemic toxicity. The results are summarized, giving cocaine, beta-eucaine, alpin, and tropacocaine, as most useful for mucous-membrane anæsthesia, quinine hydrochloride being placed as fairly active. Novocain is relatively inefficient. Alkalization increases efficiency from two to four times. The solutions of the salts may therefore be mixed with an equal volume of 0.5 per cent sodium bicarbonate. The mixtures do not keep well, and for use should be recently made. Addition of epinephrin does not increase efficiency. For infiltration and injection, cocaine, novocain, tropacocaine, and alpin are found to be about equally efficient. Several of the synthetic

anæsthetics can completely take the place of cocaine; "in view of this fact, it would be feasible to prohibit entirely the importation, manufacture, sale, and use of the habit-forming cocaine."

For regional anæsthesia of the upper limb, it is recommended²⁰ that the blind method should be replaced by an open operation, done under local analgesia, which exposes the cords of the brachial plexus and permits of certainty and safety of injection.

A new local anæsthetic, **Nikalgin**, which is, however, applicable only to denuded surfaces, receives favourable notice.²¹

An excellent anatomical and experimental study of *sacral anæsthesia*²² brings out the facts that the injection fluid is not to be found inside the dura-mater, that it is possible to puncture a large vertebral vein, that the injected matter passes without difficulty along the peridural space and bathes the peripheral nerves, and that anatomically sacra and the position of the hiatus vary widely.

REFERENCES.—¹*Surg. Gyn. and Obst.* 1918, Oct. 319 (abstr.); ²*N. Y. Med. Jour.* 1918, i, 679; ³*Jour. Amer. Med. Assoc.* 1917, ii, 857, and 1918, i, 277; ⁴*N. Y. Med. Jour.* 1917, ii, 591; ⁵*Brit. Med. Jour.* 1918, i, 254; ⁶*Ibid.* 1917, i, 722; ⁷*Presse Méd.* 1918, Feb. 28, 111; ⁸*Med. Bull.* 1918, April, 447; ⁹*Brit. Med. Jour.* 1918, i, 78; ¹⁰*Lancet*, 1917, ii, 667; ¹¹*Proc. Roy. Soc. Med.* xi, No. 2; ¹²*Canadian Med. Assoc. Jour.* vii, No. 9, 769; ¹³*Presse Méd.* 1918, Aug. 29, 441; ¹⁴*Glasgow Med. Jour.* 1917, Dec. 334; ¹⁵*Lancet*, 1918, i, 794; ¹⁶*Ibid.* ii, 454; ¹⁷*Ann. Surg.* 1918, April, 462; ¹⁸*Jour. Amer. Med. Assoc.* 1918, ii, 183; ¹⁹*Ibid.* i, 216; ²⁰*Therap. Gaz.* 1918, May 15, 371; ²¹*Med. Rec.* 1917, ii, 555; ²²*Ann. Surg.* 1917, Dec., 718.

ANEURYSM, AORTIC.

Carey Coombs, M.D., F.R.C.P.

Rodama¹ describes eleven cases of aneurysm of the aorta successfully treated by Abrams's **Spondylotherapy**, which consists of systematized percussion of the seventh cervical spine. This is said to produce reflex vasoconstriction of the aorta. It sounds an unlikely story, but for so desperate a disease no remedy should be rejected without due trial. In some of Rodama's cases the evidence on which the diagnosis was based is not strong.

REFERENCE.—¹*Med. Rec.*, 1918, i, 635.

ANEURYSM, ARTERIOVENOUS. (See HEART AND BLOOD-VESSELS, SURGERY OF.)

ANGINA PECTORIS.

Carey Coombs, M.D., F.R.C.P.

CAUSATION.—A most interesting series of papers by Chicago clinicians^{1 2 3 4} directs our attention to a point of really practical importance. What is the mechanism of production of cardiac pain? They are rather inclined to accept Sir Clifford Allbutt's theory that the pain arises in the first portion of the ascending aorta and is due to disease of that area. Against the 'coronary ischæmia' theory they argue the absence of cardiac pain in fatal illnesses that turn out post mortem to have been provoked by coronary thrombosis. In connection with these observations may be noted Bousfield's,⁵ to the effect that an electrocardiogram taken during an attack showed delay in conduction through the right *a-v* bundle, probably due to reflex stimulation of the vagus; while, following the attack, there was evidence that it had in some way altered the functioning of the muscular tissue of the left ventricle at the root of the aorta. Herrick and Nuzum remark upon the occurrence of anginal attacks in four cases of profound anæmia of various types. Indeed, the morbid conditions in which this symptom was encountered by these observers are so multiform that it is difficult to visualize either of the phenomena propounded—aortic disease or coronary obstruction—as a causal factor common to all cases. Perhaps the truth is that either may be associated with that which actually provokes the pain; some biochemical change in the myocardium liberating katabolites of a pain-provoking kind.

SYMPTOMS.—One group of cases to which the Chicago clinicians draw attention is characterized by severe pain—often epigastric—as well as or instead of thoracic; vomiting, and collapse, often fatal. The heart sounds are muffled, and there may be a pericardial rub. Such symptoms have been shown by autopsy to be due to thrombotic obstruction of the coronary arteries. Attacks of this kind are often fatal, but not necessarily so at once.

Goodman⁶ describes a case of paroxysmal umbilical pain in an old lady, which he classifies as 'angina abdominis,' and possibly due to atheroma of the abdominal aorta or its branches.

TREATMENT.—The successful treatment of angina does not begin and end with the exhibition of nitrites. Indeed, several of the American writers appear disappointed with the effect of vasodilators. Ingals finds that Nitroglycerin given in the form of fresh tablets, placed under the tongue, and in large doses, is of great value. He thinks we are apt to give too little, and to use stale, inactive preparations. The value of the *Nauheim* régime, he says, lies in rest and diversion, with graduated exercise. *Digitalis* is of disputed usefulness. No one would expect it to relieve an acute attack, but there are cases exhibiting other features which are definite indications for digitalis in which the drug is of undeniable value. *Potassium Iodide* is often useful, even in non-syphilitic cases. In a word, the proper treatment of angina lies in recognition of the fact that it is a form of cardiac pain and symptomatic of cardiac disease of various kinds. The underlying lesion must be treated, and the pain itself relieved by Nitrites, Morphia, Heat, Alcohol, and even Chloroform.

REFERENCES.—¹Herrick and Nuzum, *Jour. Amer. Med. Assoc.* 1918, i, 67; ²Ingals and Mecker, *Ibid.*, 969; ³Le Count, *Ibid.*, 974; ⁴*Ibid.*, 1030; ⁵*Lancet*, 1918, ii, 457; ⁶*Med. Press and Circ.* 1918, ii, 7.

ANKYLOSTOMIASIS.

Sir Leonard Rogers, M.D., F.R.C.P.

The International Health Board of the Rockefeller Foundation¹ have continued their great campaign against hookworm disease in the Southern States, Brazil, Central America, West Indies, Ceylon, Malay States, etc., with good results. In Barbados, porous, quickly-drying coral-limestone districts were much less infected than other geological formations. S. T. Darling, M. A. Barber, and P. Hacker² record important data regarding the efficiency of different methods of treatment based on extensive trials in the Malay Peninsula, Java, and Fiji during two and a half years. Nearly 100 per cent of the natives were found to be infected with from 1 to 1000 or more worms. Necators were more easily removed than ankylostomes, 96.8 per cent of the former being removed by the first treatment, against 76.6 per cent of the latter. The efficiency of different treatments was estimated by working out the proportion of the worms removed by the first trial treatment of the total, obtained by a sufficient number of active treatments to remove all the worms, as shown by disappearance of ova from the stools. Only the same races of people were compared, and the type of worm found was noted. The percentage efficiency of different drugs was as follows: *Betanaphthol* 20 gr. in capsules, two doses with two hours' interval, 26.7 per cent; *Eucalyptus* 30 min., *Chloroform* 45 min., and *Castor Oil* to 12 dr., divided into two doses of 6 dr. each, and given with two hours' interval, 46.9 per cent; *Thymol* 30 gr. in emulsion, two doses with two hours' interval, 88.6 per cent; and *Oil of Chenopodium* 1 c.c. in capsules, two doses with two hours' interval, 96.15 per cent. Three doses of 30 gr. each of thymol, however, removed 97.8 per cent of the worms, being thus equal to oil of chenopodium. But smaller doses of oil of chenopodium were more efficient than reduced doses of thymol, and the former is also more effective than thymol against the more resistant anky-

lostomes. Further, two treatments with half the maximum dose of oil of chenopodium, namely, 0.5 c.c. in capsules, three doses at hourly intervals, removed 99.03 per cent of the worms, which was the best result obtained. The oil is more effective in freshly-filled gelatin capsules than in the manufactured soft capsules. The patients also found the oil less unpleasant to take than thymol. In the case of the oil at least a week should elapse between two treatments, which made it quite safe. The oil of chenopodium was more effective in removing other worms, while the percentage of failures was only 7.6, against 23.6 with thymol, so they regard chenopodium oil as the drug for choice, preferably in 0.5-c.c. doses repeated three times at hourly intervals, making a total of 1.5 c.c. for a treatment. Magnesium Sulphate was preferable for the final purge, less toxic symptoms being seen after its use than after castor oil.

C. A. Lane³ reports on the prevalence and treatment of hookworm disease in the Darjeeling Hill tea areas, and found two-thirds of the labouring class to be infected, mostly lightly, although he thinks even light infections decrease working capacity. He used thymol in the treatment, as oil of chenopodium was not available, and advocates small septic tank installations as the best sanitary arrangement for reducing the incidence of the disease.

C. A. Lane⁴ also deals with the technique of a standardized method of searching for hookworms in measured quantities of stools, and with a new plan he calls the levitation method, which is based on the fact that hookworm ova tend to stick to a glass slide on which they have been deposited. After careful shaking in a corked tube of a measured quantity of faeces and water, it is passed through wire gauze with 100 meshes to an inch to remove the grosser particles, and a measured amount allowed to settle on a slide for five minutes, after which it is gently immersed in water to remove the lighter particles, leaving the ova with little else on the slide. It is claimed that a tenfold concentration of the ova is obtained, while they are also easier to see, and one microscopist can examine one or two hundred slides a day with sufficient assistants to prepare them. Full details and illustrations are given.

REFERENCES.—¹Third Report for 1916; ²*Jour. Amer. Med. Assoc.* 1918, i, 500; ³*Ind. Jour. Med. Research*, 1917, Oct., 350; ⁴*Ind. Med. Gaz.* 1918, May, 173, and *Ind. Jour. Med. Research*, 1918, July, 1.

ANUS, DISEASES OF. (See RECTUM AND ANUS.)

APHASIA.

J. Ramsay Hunt, M.D.

Byrom Bramwell¹ discusses the interesting question of *crossed aphasia*. This term he coined some years ago to describe those rare cases in which a lesion on the left side of the brain in a left-handed man produces aphasic symptoms, and vice versa, a right-sided brain lesion producing aphasia in a right-handed man. For a proper understanding of this rather difficult question the following points are emphasized:—

The vast majority of mankind use one hand more than the other, i.e., are either right-handed or left-handed.

The great majority of persons are right-handed, a small minority, probably about 2 per cent of the whole, being strongly left-handed.

The ancestors of the great majority of persons have for generations been right-handed, and, consequently (a) heredity, (b) congenital or organic aptitude, and (c) actual acquirement (habit, example, social usage, and education) all tend to make the majority of persons right-handed.

It therefore follows that in right-handed persons the left hemisphere, and in left-handed persons the right hemisphere, is the 'leading' or 'driving' side (hemisphere) of the brain.

With rare exceptions the 'leading' or 'driving' speech centres are situated in the hemisphere of the brain which is, so far as the movements of the hand are concerned, the 'leading' or 'driving' side.

Consequently, acute and complete destruction of the left motor-vocal speech area, when it occurs in a right-handed man, in the vast majority of cases, produces motor-vocal aphasia; while the same lesion, when it occurs in a left-handed man, does not, in most cases, produce motor-vocal aphasia. Vice versa, acute and complete destruction of the motor-vocal speech area in the right hemisphere of the brain, when it occurs in a left-handed man, in most cases produces motor-vocal aphasia; while the same lesion, when it occurs in a right-handed man, does not, in the vast majority of cases, produce motor-vocal aphasia.

Exceptions to these statements occasionally arise. In the vast majority of cases of 'crossed' aphasia speech defect is merely temporary and evanescent. Cases of temporary 'crossed' aphasia are easily enough explained if it be granted that the cortical speech area in the 'non-leading' or non-driving' hemisphere corresponding to the speech centres or area in the 'leading' or 'driving' hemisphere of the brain is possessed of some sort of speech function which is probably carried on in conjunction with, and in subordination to, the function of the speech centres or area in the right or 'driving' side. In cases of this kind the aphasic symptoms usually pass off in the course of a few days.

The question of 'mirror reading' and 'mirror writing' is of great interest and importance, and has some bearing on this subject. If one takes a pencil in each hand and then writes simultaneously with the two hands on a sheet of paper, it will be found that one writes from left to right with the right hand and from right to left with the left hand—one writes outwards from the centre of the body with each hand. And if one compares the two writings—if one is able to write easily in this way with the two hands—it will be seen that they are absolutely identical—the 'mirror writing' (written with the left hand), if reversed and placed for the purposes of comparison above the writing written with the right hand, is found to be identical, stroke for stroke, with the writing of the right hand. If one is an expert writer in this way, with the right and left hands simultaneously, and one makes a series of flourishes and curves, every curve and flourish will be found to be identical in the two writings. This seems to show that the motor discharge which produces the movements necessary for the act of writing is identical in character on the two sides of the brain (in the two hand centres). Presumably, therefore, both motor discharges are stimulated and governed from the same sensory centre, which, in right-handed persons, is presumably situated in the left, and in left-handed persons in the right, hemisphere. The identical character of the two writings written simultaneously with the right and left hands would appear to indicate that this simultaneous discharge of the two motor writing centres in the left and right sides of the brain must have been stimulated and governed by the same sensory discharge, i.e., by the discharge of the visual on one, probably the left or active, side of the brain.

REFERENCE.—¹*Edin. Med. Jour.* 1918, 220.

APPENDICITIS IN INFANTS.

Frederick Langmead, M.D., F.R.C.P.

Abt¹ has collected from the literature 80 cases in infants under two years of age, of which 2 cases were possibly prenatal. One of these was doubtful and occurred in a new-born baby suffering from hernia into the umbilical cord. The other case was that of a baby who died from poisoning by mercuric chloride forty hours after birth, and whose appendix was congested, twisted, and bound to the cæcum by numerous adhesions. Other cases occurred in the following

age groups: 18 in infants under three months; 6 in children aged from three to six months; 11 in children from six to twelve months; 40 in children between one and two years old. The temperature is unreliable; it may be very high, or subnormal. The pulse usually corresponds to the temperature. Rigor or shivering—symptoms unusual in infants—were occasionally recorded. Constipation is the rule, and occurs in the severer cases, but it may alternate with diarrhoea, which is more usual in the milder forms. Among causes, traumatism and diseases of the alimentary tract seem to be included, and infection may travel along the lymphatics, or possibly directly from the cæcum. Appendicitis was also noted as following erysipelas, scarlet fever, pulmonary and pleural affections, tonsillitis, and other diseases. Foreign bodies, such as worms in the appendix, may be the direct cause. Leucocytosis of polymorphonuclear type is present in nearly every case, except when immunity is completely broken down by severe sepsis, when the white blood-count may be low.

DIAGNOSIS.—This is difficult, and the mortality high. It is often confused with intussusception, intestinal obstruction, pneumococcal peritonitis, pleurisy, pneumonia, gastro-enteritis, ileo-psoas abscess, coxalgia, and occasionally with typhoid fever. Tenderness over McBurney's point, if elicited, is of great value, but the tenderness may be greatest on the left side, or may be unusually high. Rectal examination is of particular importance, for the presence of a palpable resistance on the right side, in association with other symptoms, is a very valuable diagnostic aid.

REFERENCE.—*Jour. Amer. Med. Assoc.* 1917, ii, 1562.

APPENDIX VERMIFORMIS, DISEASES OF. *E. Wyllys Andrews, A.M., M.D.*

Raimann¹ reports 12 cases of *primary carcinoma of the appendix*. These occurred in 10,561 specimens, and also 5 previous cases among 2500 specimens. In all, almost 300 have been reported in the literature. The diagnosis was not made clinically in any of these 12 cases before operation. The tumour was grossly diagnosed in 4 cases. It was the type of small-celled carcinoma in 82 per cent. Acute inflammation was present in 7 per cent. In the history of this disease it is interesting to note that the condition has never been diagnosed clinically before operation. It is also to be noted that there may be extensive metastases before diagnosis. Sometimes the diagnosis has been made only after recurrence, because the early specimen was not microscopically examined. Every appendix, therefore, should be subjected both to gross and histological study.

P. D. Wilkie² presents interesting points on the *diagnosis of acute appendicitis*. In the study of cases in the Naval Medical Service they found that the appendix had much lymphoid tissue, and that inflammation was associated with a similar condition in the cæcum. The obstructive element due to swelling was also very important in the etiology, as this was rapidly followed by gangrene and perforation. Certain of their cases were classified as pseudo-appendicitis. These had pain on the right side, with marked tenderness, but turned out not to be genuine appendicitis. The leucocyte count is a great help in differentiation.

Beekman³ presents an analysis of 500 cases of acute appendicitis in a five-year period in Bellevue Hospital, New York. The mortality was 34, or 6.8 per cent. Figures from other New York hospitals were approximately equal, as were those from other parts of the world. Of the 34 deaths, 18 were due to peritonitis, the rest being from various complications, such as phlebitis, liver abscess, pneumonia, faecal fistula, subphrenic abscess, etc. Abscess was present in 107 cases, or 21 per cent. Ileus or paralytic obstruction occurred but twice. Pneumonia occurred 12 times, or 2.5 per cent; faecal fistula 24 times,

or 5 per cent, with 4 deaths. The age of incidence showed 42 cases in the first decade, 158 in the second, 174 in the third, 62 in the fourth, and only 24 over fifty.

REFERENCES.—¹*Amer. Jour. Med. Sci.* 1918, Aug.; ²*Jour. R.N. Med. Service*, 1917, Oct.; ³*Amer. Jour. Med. Sci.* 1917, Oct.

ARTERIOSCLEROSIS.

Carey Coombs, M.D., F.R.C.P.

ETIOLOGY.—Two interesting papers by Williamson¹ and Manlove² may be taken as affording a basis for consideration of those factors that lead to premature arterial degeneration. As Williamson points out, arterial degeneration may or may not be preceded by high arterial tension. His paper is chiefly concerned with the hyperpietic type of arterial disease, in which high pressure is a preliminary feature. He adopts the view expressed by Russell and others that: (1) High tension is caused by direct stimulation of the muscle fibres of the arterial media by toxic substances; (2) These substances produce in time progressive degeneration of the arterial media; (3) Muscle degeneration is followed by fibrous hyperplasia, or sclerosis, of the arterial media. The source of the toxic bodies, he hints, is perhaps to be found in the excess protein of the diet of the average 'civilized' person of the pre-war days.

Manlove, on the other hand, writing of Filipinos, finds that their arterial changes are not preceded by high pressure. It seems that widespread atheroma is common after middle life among these people. Of course, the arteries of all of us begin to deteriorate from about 35 onwards. Metchnikoff put this down to the cumulative action of toxic products of bacterial activity in the large intestine, and Manlove also suggests that the relatively high incidence of atheroma among Filipinos after the age of 40 is due to the prevalence of protozoal infestation of the bowel among these people, causing chronic toxæmia of the type conceived by Metchnikoff, in an exaggerated form.

SYMPTOMS.—In Williamson's address two important points are emphasized. The first is the occurrence of crises of high blood-pressure. These may occur in persons whose pressure is usually normal, and are then forewarnings of a more abiding state which will ensue if measures are not taken to stave it off; or they may be mere exaggerations of a pressure which is already raised. In the latter case they bring with them a special risk of apoplexy. He also reminds us of the frequency of attacks which suggest a localized arterial spasm, e.g., transient hemiplegia, aphasia, intermittent limp, and such-like. These attacks should be interpreted as evidence of a progressive arterial degeneration of the part involved, a process which is likely to interfere permanently and injuriously with the nutrition of the part before long.

TREATMENT.—The moral to be drawn from these contributions is a simple one; treatment lies in prevention. In the case of the Filipino with the infected bowel, he must be freed from his protozoa; while the hustling European must learn to eat to live, and not to load his system with hurtful nitrogenous katabolites derived from his excessive intake of protein. As Williamson points out, the lessons taught by the war diet must not be forgotten. We can live on a diet which contains a great deal less meat than we formerly consumed, and it will be a good thing if we have to do so for a few years yet.

REFERENCES.—¹*Lancet*, 1918, i, 627; ²*Philippine Jour. Sci.* 1917, 233.

ARTHROPATHIES. (See JOINTS, NEUROPATHIC AFFECTIONS OF.)

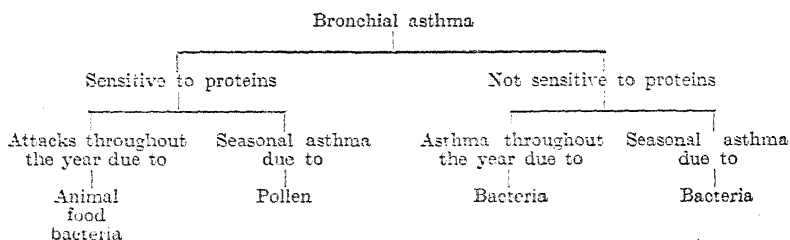
ASTHMA, BRONCHIAL.

Arthur Latham, M.D., F.R.C.P.

It is now agreed that anaphylaxis plays a large part in the causation of bronchial asthma. In adults the usual cause of the anaphylactic phenomena is the introduction into the body of a foreign protein in the shape of animal

or vegetable dust; in a smaller number of cases the foreign protein is introduced in the diet; and in a still smaller percentage the foreign protein is obtained from organisms, more especially the staphylococcus and a diphtheroid bacillus. In young children the foreign protein is usually introduced in the diet, and white of egg would appear to be the commonest offender. A number of articles have appeared confirming the above view of the causation of asthma, and basing appropriate treatment of the condition on this view. For example, F. B. Talbot,¹ in discussing the treatment of asthma in children, says these cases are now known to be manifestations of anaphylaxis to some form of protein, and can be divided into those due to inhalation of the proteins, such as pollens and animal emanations, and those due to ingestion of various forms of food. The precise cause of each case is to be sought by careful history-taking, and established by means of the cutaneous test for hypersensitiveness. This consists in applying fresh solutions of suspected proteins to linear scarifications, and observing that one which produces a typical reaction. When the causative agent has been discovered, treatment resolves itself into two general methods. In the one the object is to prevent the further absorption of the offending protein. This can be accomplished in the case of the inhaled substances by **Change of Abode**, and in many of the cases due to ingestion by the total elimination of the sources of the protein from the diet. In the latter group, however, it is often impossible to accomplish this end and maintain adequate nutrition. Resort must be had, in such cases, to the effort to establish some degree of immunity. This is best done by total removal of the offending food from the diet, and the administration of the protein in ascending doses, beginning with a minute one, until some degree of tolerance is established. In the case of egg hypersusceptibility, for example, the initial dose is usually only 1 mgrm., and the maximum is reached at about 10 grms. In the case of a number of the vegetable proteins, the sensitizing properties can be largely destroyed by exposure to high heat. Where milk is the cause, boiled milk or buttermilk can sometimes be taken, or goat's milk may be used. In most cases, if the acute manifestations can be controlled, the child will outgrow his hypersusceptibility.

J. Chandler Walker,² as the result of a clinical study of 400 patients, concludes that the following is a useful classification in determining the cause and best method of treating a given case of asthma:—



B. W. Gosh³ has treated a number of cases of asthma, during the intervals between the paroxysms, with **Soamin**. He states that a selection of the cases is necessary, as not every variety of asthma improves on soamin. True bronchial asthma, he finds, responds very favourably to this treatment, but cases in which there is no eosinophilia do not improve. The treatment should not be prescribed in the case of patients suffering from chronic renal disease.

Method of Administration.—This is always done by hypodermic injection, given at the commencement twice a week, and, as the conditions improve, then

once a week for two or three injections. If paroxysms do not appear during this period it may be given once a fortnight, and then once a month for one or two more injections. The number of injections varied from six to eighteen, rarely more, to produce total absence of paroxysms. Some of the patients were freed from any attack for over one year.

One c.c. of water is boiled in a teaspoon, and then the soamin (Burroughs Wellcome and Co.'s tabloids) is dissolved; the solution is now injected into the arm, the part being sterilized by painting with tincture of iodine. The injection is not very painful, and children and women bear it well. Sometimes small nodular masses form at the seat of injection, but these eventually disappear; a feeling of faintness followed in one or two cases on the first day of injection.

Dose.—The first dose is 1 gr., the second 2 gr., the third and maximum dose 3 gr. There is no occasion to use a larger dose than 3 gr. If the patient does not show any sign of improvement, however small, after the sixth injection, the chances are that there will be no improvement at all.

REFERENCES.—¹*Laryngoscope*, 1918, April, 315; ²*Boston Med. and Surg. Jour.* 1918, ii, 288; ³*Glasgow Med. Jour.* 1918, 343.

AURICULAR FIBRILLATION.

Carey Coombs, M.D., F.R.C.P.

This syndrome, a terminal phase of cardiac disease, is a common clinical experience. Levine's¹ figures show that almost as many cases of auricular fibrillation were admitted to hospital in a period of thirty months as there were of pneumonia during the same period. Yet it seems to be practically unknown to the bulk of the profession.

DEFINITION.—A symptom-complex, nearly always associated with signs of grave organic disease of the heart, consisting of: (1) A quick, 'totally' irregular pulse, i.e., an arrhythmia that is absolute, with no trace of the normal rhythm remaining; (2) Absence of evidences of auricular systole: pre-systolic murmurs, if heard previously, drop out; and graphic records, whether polygraphic or electrocardiographic, show no sign of orderly auricular contractions; (3) Evidence of quick, irregular auricular contractions.

To discover (1) and (2) graphic records are needed; but in nine cases out of ten the syndrome can be detected by discovering (1) by feeling the pulse and listening to the heart.

ETIOLOGY.—Of Levine's 128 cases, half were men and half women. Rather more than one-third were cases of definite post-rheumatic heart disease of the type usually labelled 'mitral stenosis.' Syphilis is an unimportant factor, but cardiosclerosis constitutes the background almost as often as cardiac rheumatism. The rheumatic cases are mostly under 50, the cardiosclerotics over that age.

PATHOLOGY.—The writer's observations, as yet incomplete, have convinced him that the essential lesion is degeneration of the auricular myocardium ending in failure of auricular contractility. The orderly systole of the auricle is lost, but surviving islets of muscle undertake their own affairs, and the result is anarchy. Large numbers of stimuli are generated in the auricular walls, and are showered down into the ventricle, helter-skelter, as fast as the conducting paths can carry them. The result is a disorderly stimulation of the ventricle and a veritable 'delirium cordis.'

PROGNOSIS.—In eighteen of Levine's cases the arrhythmia was only transitory. This is an unusually high percentage. For the most part the onset of auricular fibrillation marks a definite and irrecoverable downward step in the career of a gravely diseased heart. Speaking broadly, the prognosis is that of the underlying lesion, made worse by the onset of fibrillation.

TREATMENT.—Auricular fibrillation calls imperatively for two things—rest and Digitalis. In a majority of patients this drug acts almost specifically, reducing tachycardia, mitigating but not often abolishing the arrhythmia, and relieving all the symptoms. After a careful study, Halsey² says that the important thing is to give enough digitalis and keep on giving it. The course of treatment may well begin, in urgent cases, with an intravenous injection of *Strophanthin*, 5 mgrs., followed by any good preparation of digitalis pushed till a good result is attained. As Halsey points out, we should aim at reducing the pulse-rate to 70 and keeping it there. To this end the patient must be taught to 'live on' digitalis, regulating the dose as his needs require. Bishop³ finds that the action of digitalis is enhanced by giving powdered *Ipecacuanha* with it. He uses a tablet containing $\frac{1}{2}$ gr. of the latter with $\frac{1}{2}$ gr. of powdered digitalis.

REFERENCES.—¹*Amer. Jour. Med. Sci.* 1917, ii, 43; ²*Ibid.* 1918, i, 344; ³*Med. Rec.* 1918, ii, 356.

AVIATION, THE EAR IN.

John S. Fraser, M.B., F.R.C.S.

The Importance of Vestibular Tests.—According to Isaac H. Jones,¹ perfect equilibration is accomplished through harmonious co-operation of the eye, the muscle sense, and the 'balance sense' of the ear. After loss of one of the senses responsible for equilibration, compensation may take place to a certain extent. When the human being becomes a bird, he suddenly finds himself in an entirely new environment. On what does the aviator rely in order to maintain his equilibrium? When he is sailing through the clouds or in the dark, his eyes cannot give him the slightest information as to his position in space—cannot even tell him whether he is 'right side up.' The muscle sense plays a part, but it is hardly conceivable that the weight of his body could determine his position in space merely by the sense of gravity. It is obvious that he relies primarily upon his vestibular labyrinth. It is easily conceivable that some of the unexplained accidents in aviation may be due to the decrease of the usual air-pressure when at great heights. Prudence would suggest a most careful examination of the function of internal ears before taking up flying as an occupation. Every portion of the 'balance apparatus' should be declared intact and normally functioning. If, after the Bárány tests, the candidate shows normal responses in nystagmus, past-pointing, and falling, he is fit for the service. If he does not, he is unfit. (See MEDICAL ANNUAL, 1918, pp. 591-8).

Ear Reactions in Aviation.—From examination of numerous aviators and from personal experience, Lacroix² finds that disturbance of the vestibular apparatus during flights, manifested in vertigo, is surprisingly uncommon. Though dizzy on a second-storey balcony, he never experienced vertigo in flights, even during spiral evolutions of the aeroplane, or rapid descents. The explanation of this is apparently that terrestrial landmarks are, during flight, too distant to excite visual vertigo, while tactile and labyrinthine vertigo are, as a rule, excluded by the relative stability of aeroplanes as now perfected. A tendency to vertigo appears, in the average subject, only where there is abnormal rolling, pitching, or 'scenic railway' movements bordering on the dangerous. No aviators became dizzy during flights except two or three who had previously suffered from accidental falls on the head. Auditory disturbances, on the other hand, are practically the rule during flights, such as intermittent tinnitus and deafness, especially at high altitudes and during rapid descents and ascents. These symptoms are at least partly due to the variations in barometric pressure in the different air strata, and are relieved by swallowing movements, which are often carried

out automatically. Aviators returning from test flights often show on otoscopic examination a more or less marked and uniformly similar reaction of the ear-drum, viz., a red zone in front of and behind the handle of the malleus, and a congestion, at times very pronounced, of Shrapnell's membrane. After prolonged flights, slight tinnitus and deafness may persist for a few hours or even a day. In subjects already suffering from otic or tubal disease, aggravation of the condition may probably occur. Hence, in candidates for an aviator's licence, a normal condition of the middle and internal ear is a pre-requisite.

Hill Hastings³ has been impressed by the regularity in the reaction responses to the vestibular tests in normal men. Spontaneous nystagmus was not once found. The average duration of nystagmus after rotation was 23.49 seconds after right rotation and 24.17 seconds after left rotation—15 to 35 being the extremes. The average difference from right rotation and left rotation was 2½ seconds. In only 2 of the 200 cases was there a difference of 10 seconds. In only 11 was there a difference of over 5 seconds. If more than 10 seconds' difference occurred, one should be suspicious and resort to the caloric test. *Spontaneous past-pointing* was not found. The applicant should be shown just how the pointing test is to be done by the examiner going through the test. *Past-pointing after turning*: The normal reaction was elicited in about 90 per cent of those examined. *The falling reaction* was found to be abnormal only 10 times in 259 cases.

Ear Tests for the Air Service.—Scruton⁴ holds that the physical requirements of the aviation section of the U.S. army are really in no way unduly severe or rigid. Of the 'flyers,' 1364 were examined in three months; of these, 850 were accepted and 514 rejected—38 per cent rejections. Out of the 514 rejections, lesions of ear, nose, and throat were responsible for 148, as follows: abnormality of—external meatus, 2; ear drum, 12; hearing, 86; static and dynamic labyrinthitis, 8. Nystagmus prolonged, 8; nystagmus shortened, 8; marked unequal nystagmus, 4; falling, 1. Ozena, 11. Ethmoiditis, 8.

The rotation tests have come into considerable prominence. This test is the one most feared by the candidates, but only 21 men out of 1364 have been disqualified for failing to respond correctly to the rotation tests. The test is extremely important, as a normal balance mechanism is absolutely essential in aviation service. If the Bárány tests show normal responses, they indicate not only normal labyrinths but normal eighth nerves and normal vestibular pathways throughout the brain. If these tests are carried through according to the prescribed directions, candidates rarely experience any unpleasant effects. Care must be exercised to maintain a correct position in the chair and rotate exactly ten times in ten seconds, stopping the rotation with a considerable jolt. It has never been necessary to resort to the caloric test.

The Value of Laboratory Tests.—Fisher and Lyman⁵ state that crashes during 'stunt' flying are due to a momentary loss of faculties. Many of the pilots who survive the crash emphasize dizziness (vertigo) as the cause of this loss of control. Experiments at the Medical Research Laboratory at Mineola point conclusively to the fact that 'stunt' flying is essentially an ear problem. Each semicircular canal produces vertigo in its own plane. The conditions of 'stunt' flying can be reproduced in the turning chair. There are three cardinal planes of vertigo—horizontal, frontal, and sagittal. *Horizontal vertigo (as after waltzing) is the least disturbing of the three.* When a disturbing or disabling vertigo is induced in the vertical canals, the effect can generally be ameliorated by bringing the affected vertical canals into a horizontal position. All types of vertigo are made less disturbing by continual repetition.

In the *spinning nose dive* the aviator, face downwards, is whirled about an axis. The vertical canals are stimulated in the frontal plane. (This can

be reproduced by rotating the aviator in a turning chair with his face downwards.) When the aviator comes out of the spin, the plane of vertigo, which until now has been parallel to the ground, becomes vertical in a frontal plane, i.e., from side to side. As this is very disturbing, the aviator is apt to attempt to correct the sensation by throwing his plane into another tail spin in an opposite direction. The real remedy is to keep the head down so that the vertigo remains in the horizontal plane. When doing a *tight spiral*, the aviator is whirled about an axis with his head and body practically parallel to the ground but facing the horizon. (The sensation can be reproduced by rotating the aviator in a turning chair with his head bent over to one, or other, shoulder.) When he comes out of the tight spiral the plane of vertigo becomes vertical in a sagittal plane, so that he feels himself pitching backwards and forwards. The remedy is to tilt the head sharply to one side when coming out of the spiral. In making the *loop*, the vertical canals are stimulated in the sagittal plane (as in the spiral), but to a less degree. In a similar manner the vertigo induced by the *barrel roll*, *falling leaf*, *wing over*, and other manoeuvres can be analyzed. Fisher and Lyman say the experienced 'stunt' flier is not as a rule upset by vertigo, as he instinctively develops certain manoeuvres which neutralize the disabling effects of vertigo. Even these experienced men, on being put through the various 'stunts' in the laboratory, were unanimously of opinion that the method was of the greatest practical value. The flier may be educated in the laboratory to disregard the vertiginous effects of the 'stunts,' and, without danger, acquire a tolerance to these evolutions to a degree impossible in the air. This can be accomplished by the use of an otological apparatus known as the 'orientator.' This resembles the cockpit of an aeroplane, and is suspended in concentric rings, after the manner of a ship's compass. The movements of the apparatus, which are possible in all directions (except actual progression), are governed by the individual, who is seated and strapped in the machine and uses a set of controls resembling those of an aeroplane.

REFERENCES.—¹*Laryngoscope*, 1918, June, 473; ²*Bull. de l'Acad. de Méd.* 1917, Jan. 16; ³*Ann. Otol. Rhinol. and Laryngol.* 1918, June, 481; ⁴*Ibid.* 1918, June, 528; ⁵*Jour. Amer. Med. Assoc.* 1918, Dec., 1977.

BANTI'S DISEASE.

Herbert French, M.D., F.R.C.P.

Banti's disease is the subject of a lengthy discussion by Norris, Symmers, and Shapiro,¹ and by Moschowitz.² The gist of their papers is that although the term Banti's disease may be useful as a label for certain cases, it is a pity that it exists, because there is increasing evidence to show that it is not a clearly defined disease at all, but a clinical condition which has more than one cause. It would be better to speak of Banti's *syndrome*. Banti himself thought that the condition he described was a definite single disease which, starting with simple splenomegaly without ascertainable cause, later developed anæmia and a tendency to hæmorrhages—this stage being virtually that which has also been termed splenic anæmia—and ending up, after a variable number of years, which might be many, as cirrhosis of the liver with terminal ascites. Evidence is accumulating, however, to show that splenic anæmia itself is not a single disease, but a syndrome due to more than one possible cause, and the splenic anæmias which arise from any one of these known or unknown causes may all terminate with cirrhosis of the liver and ascites. Just as splenic anæmia has more than one cause and is a syndrome rather than a disease, so the termination of splenic anæmia in cirrhosis of the liver should not be called Banti's disease, as though it always had the same pathology, but rather Banti's syndrome, for which the special pathology in each particular case has still to be sought. Whether this view is correct or not

still remains to be proved, but there is increasing evidence in favour of it; and probably as time goes on the various kinds of conditions which may produce Banti's syndrome will be sorted out from one another and differentiated by their primary pathology. It is, for example, most important in all such cases to test the Wassermann reaction, because syphilis, either congenital or acquired, is responsible for many cases which hitherto have been lumped in with the splenic-anæmia or Banti's-syndrome group; some authors already prefer to restrict the term 'splenic anæmia' rigidly to cases in which the Wassermann reaction is negative, declining to give the term splenic anæmia at all to the syphilitic cases. Another school, on the other hand, including those who regard splenic anæmia merely as a syndrome and not as a disease, prefer to speak of syphilitic splenic anæmia, malarial splenic anæmia, Egyptian splenic anæmia, alcoholic splenic anæmia, and so on, to emphasize their belief that splenic anæmia, like Banti's disease, is only a clinical syndrome with different causes, and not a well-defined single disease with but one cause. Norris, Symmers, and Shapiro are strong in their belief that a very high proportion of cases presenting the Banti's-disease syndrome have syphilis as the primary underlying cause, so that the importance of not omitting to have the Wassermann reaction tested is obvious.

REFERENCES.—¹*Amer. Jour. Med. Sci.* 1917, ii, 893; ²*Jour. Amer. Med. Assoc.* 1917, ii, 1045.

BED-SORES.

J. Ramsay Hunt, M.D.

W. Browning¹ details the method of treating bedsores in use at the King's County Hospital, Brooklyn, N.Y. In addition to certain general measures which all are agreed upon—e.g., cleanliness, frequent change of position, air or water beds—he suggests a special decubitus division in hospitals for chronic invalids where such cases are of frequent occurrence. He emphasizes the local method of treatment which they have found most efficacious. What is needed is an application that penetrates, disinfects, deodorizes, checks secretion, and, if possible, has some constricting quality. Bichloride of mercury does not penetrate. Carbolic acid and its kind may sear the surface, but hardly get further, and in these conditions are specially liable to induce carbolic gangrene.

There is one agent, however, that can favourably affect the tissues, and accomplish all these desirable effects. That is **Formalin** (formaldehyde), as shown by its application in histology, but used of course in proper dilution. The peculiar qualities of this agent and their adaptability to the purposes in question need no discussion. A half per cent solution of the usual 40 per cent strength serves these ends admirably, and with care causes no undesirable irritation.

A convenient way to meet the various indications each time is to cleanse the ulcer and all its ramifications with plain boiled water as warm as can be handled. Then finish with the cold formaldehyde dilution, getting it well into each crypt and sinus. This includes automatically the stimulating effect of alternating temperatures.

To avoid the exsiccating action of the solution on the user's hands it might doubtless be applied by means of swabs or under the protection of rubber gloves. With us, he says, the custom is to make the application with a syringe; this method has the advantage of facilitating its introduction into all pockets and covered tracts, and its contact with the exposed surfaces.

Finally, it is necessary to have a dressing material that keeps up the action so far as practicable in the intervals of cleansing. For this purpose the **Sub-iodide** (oxyiodide) of **Bismuth** has been found very satisfactory. It is dusted on everywhere over the area in sufficient quantity to make a protective

absorbent and antiseptic layer. This whole dressing must be repeated as often as requisite for cleanliness—at the start several times in the twenty-four hours, and thereafter twice or thrice a day is a minimum. When the raw surface becomes dry, and clean crusts form, they may be left undisturbed to facilitate cicatrization.

REFERENCE.—¹*Med. Rec.* 1917, 622.

BILE-TRACT AND LIVER, SURGERY OF. *E. Wyllys Andrews, A.M., M.D.*

Bile Tract.—Gibbon,¹ of Philadelphia, discusses the prognosis of gall-bladder infections, quoting Moynihan's well-known statement that "every gall-stone is a monument erected to the memory of the germ that lies buried within it." Acute cholecystitis may subside without operation, but requires operation if it extends over a considerable period. He thinks the infection often occurs insidiously and is aggravated by the presence of stone. With or without the presence of jaundice, cases are greatly benefited by operation and drainage. The time for operation is preferably not during the height of the attack. In 200 of his cases there were 8 without stones, with 2 deaths, and 35 cases with stones, with 10 deaths. The mortality in gall-bladder operations depends largely on whether or not cholangitis is present. Persistent jaundice as a general symptom is of grave importance, and calls for early drainage to reduce infection.

Bowgess² discusses the management of cholangitis and cholecystitis by medical means only. He agrees with Wrightmond that **Methylene Blue** eliminated through the gall-tract may be destructive to bacteria. Also **Hexamethylamine** has value in subacute cholecystitis because of its antiseptic effects. The **Alkalies** and **Salicylates** are not to be neglected. It is not to be assumed that these medical measures can take the place of radical surgery.

Many articles in English, French, and American journals have appeared during the last year urging cholecystectomy as more radical and curative than drainage of the gall-bladder.

Deaver³ found that 4 per cent of the gall-bladder cases operated on by him were secondary cases, having had one or more previous operations. In his 1916 series he had 93 cholecystectomies, with 4 deaths; 31 cholecystectomies and common-duct incisions, with 6 deaths; 28 cholecystotomies, with 3 deaths. In his opinion, failure to remove all the gall-stones was the most common cause of recurrence. He also admits that stones may recur after thorough removal. The rôle of adhesions in causing recurrent trouble must not be overlooked; these can to some extent be avoided by limiting the trauma to the surrounding parts, and the more careful use of drains and tubes.

Rothschild and Wilensky⁴ present studies in cholelithiasis which seem to show that disturbances in cholesterol metabolism are a factor in gall-stone formation. Their investigations were carried on with biliary fistulæ in order to estimate the cholesterol content of the bile. Supersaturation thus caused was found to produce calculi. They were able by poisoning with toluylendiamine to cause supersaturation of the bile in dogs and resulting gall-stone deposits. In humans, who are omnivorous animals, the cholesterol content of the bile is high, varying in different races. The cholesterol in the bile is derived from the epithelium in the gall-bladder, initiated by bacterial infection. There are many pure cholesterol stones, having 75 to 98 per cent of this substance. There are also bilirubin-calcium stones, these being the ones, no doubt, which can be detected by radiography. Upon the whole it seems certain that cholelithiasis is found in women and among people in the western world who have omnivorous dietary habits.

Erik Walter,⁵ reporting from the Lidkipping County Hospital, Sweden,

describes a case of idiopathic choledochus cyst. The signs were like those of appendicitis when first seen. A palpable tumour was felt upon the right side, somewhat lower than the gall-bladder region. An operation performed upon admission revealed a negative appendix, but a cystic tubular enlargement just inside the caput coli. This was found to have no connection with the kidney, and on puncture was found to contain 200 c.c. of bile. A probe passed through this cyst entered the duodenum. A search of the literature showed that this was a very rare infection, about 20 cases in all—the first by Longa in 1897—having been recorded. (*See Fig. 39*).

Murat Willis⁶ advocates cholecystectomy without drainage. He prefers a careful opening of the peritoneum to a broad clamping of the whole pedicle of the gall-bladder. This enables the operator to ligate separately the cystic duct and the blood-supply. After carefully closing the peritoneum over this stump, the usual drainage tube leading to the divided cystic duct may be omitted.

Abalos⁷ removed the gall-bladder in 100 cases, believing that medical treatment has only palliative value. He works from below, dividing the cystic duct between two clamps, leaving a wick drainage attached to the proximal end. The cystic artery is included in the same ligature when possible, or in a separate one. Sometimes gold- or silver-plated clamps are left on these pedicles a few days instead of ligatures. A special retractor is used to lift the liver out of the way. The value of bile drainage he recognizes, and it is sometimes an additional advantage to secure this.

Judd⁸ discusses infections and malignancy of the biliary tracts. He classifies these into several groups:—

1. Those in which chronic cholecystitis produces mild dyspepsia and general infection. A slight jaundice is sometimes present. Neuritis especially seems to be a part of the syndrome. This stage is often a forerunner of calculi and of a severer type leading to perforation, etc.
2. This group has symptoms more definite, sharp colicky attack, and residual soreness; usually no chills, fever, or jaundice. When relieved by operation, many of these are followed by recurrences.
3. Shows typical cholangitis, with stones in common duct, also many times in the gall-bladder and the cystic and hepatic ducts. All these parts must be carefully explored in operation for stones. In Judd's work in the Mayo clinic it has been usual to employ rubber-tube drainage and to fasten the tube into the common duct, and to preserve the gall-bladder if the integrity of the common duct was doubtful.
4. These are the atypical cholangitis cases, often painless. Diagnosis is often impossible before operation, as the same symptoms may occur from biliary sclerosis or carcinoma.

Liver.—William J. Mayo⁹ discusses the surgical treatment of cirrhosis of the liver and complications. Fundamentally, he recognizes two types, portal

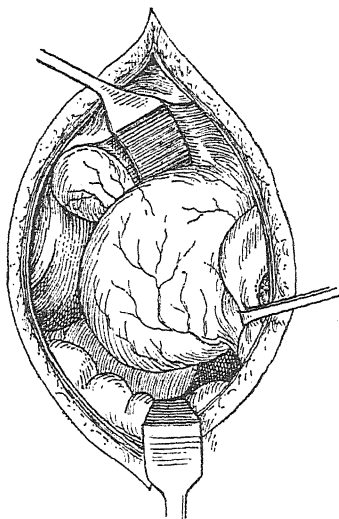


Fig. 39.—Cystic dilatation of the ductu choledochus.
(Redrawn from 'Annals of Surgery'.)

cirrhosis and biliary cirrhosis. In 52 cases of splenectomy in his clinic for splenic anæmia, portal cirrhosis was found associated a number of times. He reports 28 cases of the Talma operation, with 4 deaths; 8 cases died a little later; the remainder were more or less benefited, and 5 are in good condition. In 10 cases of cirrhosis of both types, splenectomy gave immediate relief in 9.

REFERENCES.—¹*Amer. Jour. Med. Sci.* 1918, May; ²*Amer. Med.* 1917, Nov.; ³*Surg. Gyn. and Obst.* 1917, Oct.; ⁴*Amer. Jour. Med. Sci.* 1918, June; ⁵*Ann. Surg.* 1917, Oct.; ⁶*Jour. Amer. Med. Assoc.* 1917, ii, 1943; ⁷*Rev. Med. d. Rosario*, 1918, March, 1; ⁸*Jour. Amer. Med. Assoc.* 1918, July 13; ⁹*N. Y. Med. Jour.* 1918, June 22.

BIRTH PALSIES, CEREBRAL.

J. Ramsay Hunt, M.D.

Diataxia Cerebralis Infantilis: the Ataxic Type of Cerebral Birth Palsy.—Ramsay Hunt,¹ in calling attention to this condition, says that the classification of the cerebral palsies of early life has engaged the attention of neurologists and psychiatrists for many years. Many clinical types have been described, and in recent years there has been considerable progress in our knowledge of their various causes and underlying pathological changes. The subject, however, still presents many obscurities in etiology, localization, and symptomatology.

The cases have been variously grouped in accordance with the etiology, the nature of the pathological changes, or the clinical symptoms presented. For all practical purposes the clinical classification is the important one and the most useful, as post-mortem examination and histological study are usually necessary to determine the true pathology of any case, and the original causative factors are often obscure and difficult to determine. This is especially true of the congenital cerebral defects and malformations resulting from disease of the fœtus during the period of intra-uterine life.

The common clinical type of infantile cerebral palsy is the spastic form. This may appear as hemiplegia, paraplegia, or triplegia, and very frequently as a cerebral diplegia. It is characterized by paralysis with various spastic phenomena, either alone or in association with other cerebral symptoms, such as choreiform manifestations, ataxia, tremor, athetosis, mental defect, epilepsy, and disturbance of the special senses.

A classical description of this large clinical group and its relationship to injuries received at birth was given by an English physician, Dr. Little, in 1862. In recognition of this important contribution, those cases of *cerebral spastic paralysis* resulting from injury to the brain at birth are very commonly known under the generic title of Little's disease.

Förster, in 1909, described in some detail an unusual clinical type of cerebral diplegia which he termed the *atonic-astasic type* of infantile cerebral palsy. This group stands in striking contrast to the spastic type of Little, and is characterized by motor paralysis with flaccidity. There is inability to stand or walk (astasia-abasia), great difficulty in articulation, not infrequently mutism, and a marked mental defect. A certain degree of individual movement of the extremities is possible, but all the larger and more complicated motor activities are impossible, owing to a defective action of antagonistic and synergic groups of muscles. Slight spastic phenomena are sometimes noted in the lower extremities, but the essential quality of the paralysis is flaccid and atonic.

Under the title "Congenital Cerebellar Ataxia," Dr. Batten has described what he terms a pure *cerebellar type* of diplegia. This group is characterized by ataxia of the cerebellar type, which displays, however, a decided tendency toward recovery. There is little or no mental defect, and the clinical picture is one of pure ataxia of cerebellar origin involving speech, the gait and station, and various movements of the extremities.

Therefore, according to our present classification, the cerebral diplegias of childhood may assume one or other of the following clinical forms; the *spastic* type of Little, the *atonic* or *flaccid* type of Förster, and a *cerebellar* type as described by Batten. These may exist as such in pure form or may occur in various combinations.

Ataxic Type of Cerebral Birth Palsy.—The author¹ would direct attention to this group of the cerebral diplegias as a distinct clinical variety. The ataxia is bilateral in distribution, and is characterized by a generalized disturbance of co-ordination involving the gait and station, the use of the arms and legs, and the muscles subserving the function of speech. The inco-ordination persists in the recumbent posture, and has the characteristics of a true ataxia. It is, he believes, of cortical origin. There is neither paralysis nor spasticity, and the cases observed were free from serious mental defect or epilepsy. In the absence of any direct pathological evidence, it is suggested, as the probable etiological factor, an injury to the fetal head received at birth, producing rupture or thrombosis of the cerebral veins, with limitation of the lesions to the cortex of the parietal lobes.

The clinical picture is one of pure *cerebral diataxia*, and may be regarded as the sensory equivalent of *cerebral diplegia*, in which the vascular lesion, instead of being limited to the motor area as in spastic diplegia, is situated more posteriorly behind the fissure of Rolando in the sensory sphere of the cortex, thus implicating the centres and commissural systems which are engaged in the reception and transmission of the memories of movement.

In a *résumé of the clinical reports* three cases are described very similar in their etiology and general clinical characteristics. They represent an ataxic type of cerebral diplegia which stands in striking contrast to the spastic type of Little and the flaccid or atonic type of Förster.

In all of the cases there was a history of severe injury at birth, followed by retarded and defective development of the power of motor co-ordination. There was no paralysis, and if such existed after birth it was of a transient nature, and eventually the gross motor power was completely restored. There were no evidences of spasticity. The active and passive movements as well as the reflexes revealed none of the characteristic signs of pyramidal-tract involvement. The tonus of the muscles was slightly reduced, and the tendon reflexes showed a corresponding reaction, and were moderately diminished and difficult to elicit. There was no undue flexibility of the extremities as occurs in the severer forms of hypotonia.

The essential symptom was a generalized ataxic disturbance affecting the gait, station, articulation, and the use of the individual members. This was present in all positions, including the recumbent posture, and the persistence of an ataxic disturbance of the arms and legs in the recumbent posture when no effort was required to maintain the equilibrium is particularly emphasized. The ataxic disturbance was also increased by closure of the eyes, by mental excitement, and by any effort to carry out precise and definite movements.

The disturbance of co-ordination was bilateral and fairly symmetrical, but one side may show a greater degree of involvement. It affected the finer movements of the hands and fingers as well as movements of the larger joints, and seemed to be equally distributed in this respect. There was, at times, a slight tendency to motor unrest, somewhat suggestive of a choreic disturbance, which is regarded as a manifestation of ataxia and the effort to maintain posture. The disorder of motility was clearly ataxic, and was characterized by inability to carry out precise and definite co-ordinate movements. It was not in any sense a true chorea or athetosis, the restless atactiform movements in certain postures merely suggesting the choreiform tendency. Dysarthria was also a

well-marked symptom, and was regarded as part of the ataxia. There was no nystagmus. The sensibility, both superficial and deep, so far as could be determined by the usual clinical tests, was quite normal. Especially noteworthy was the preservation of the sense of posture and the stereognostic sense. In none of the cases was there a serious mental defect. The retardation was no more than might follow a severe disturbance of speech and inco-ordination and the restriction of opportunity imposed upon the child. In none of the cases was there any tendency to grand mal or petit mal seizures. The convulsions occurring immediately after the birth had manifested no tendency to recur in later life.

Some improvement had taken place in all of the patients, and there were no indications of an increasing mental deterioration or progression of other symptoms. In this respect the ataxic form resembles the spastic type of Little with its well-recognized tendency to improvement.

The infantile cerebral diataxia is therefore a special form of the cerebral birth palsy in which the symptomatology is characterized by a generalized disturbance of co-ordination without evidences of paralysis, spasticity, epilepsy, or serious mental defect.

The clinical picture is believed to be dependent upon a bilateral vascular lesion in the parietal region, viz., hæmorrhage and softening in the distribution of the parietal veins, resulting from an injury at birth.

The parietal area of the cerebral cortex is concerned with the reception and elaboration of higher motor memories, and a bilateral lesion in this region in early life would seriously interfere with the proper development of its cortical centres, association fibres, and commissural systems. This would produce a disorder of the higher cortical functions of co-ordination—with a resulting *cortical or trans cortical ataxia*.

REFERENCE.—*Amer. Jour. Med. Sci.* 1918, 503.

BLADDER, SURGERY OF.

J. W. Thomson Walker, M.B., F.R.C.S.

Caucci¹ investigated in dogs the use of strips of fascia lata for repair of breaches of the bladder wall. He concluded that its practical use was limited, and not advisable for extensive breaches. It was applicable in cases of partial loss of substance of the bladder wall not involving the mucous membrane, such as may follow extirpation of extravescical tumours or the detaching of loops of bowel adherent to the bladder. A graft of fascia lata over a vesical suture would be useful to increase the strength of the suture line.

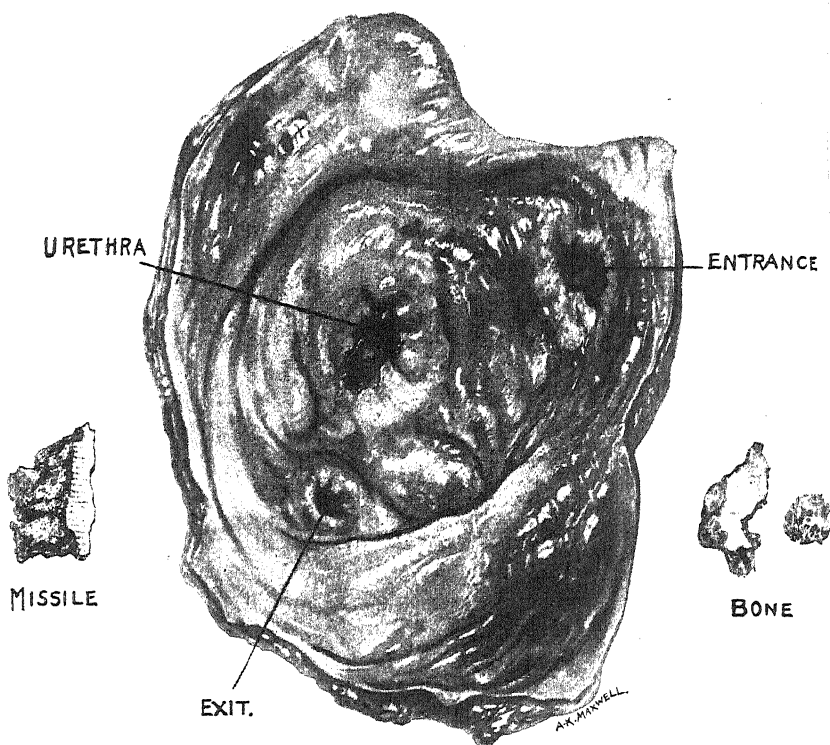
C. H. Mayo² states that since 1896 he has seen 37 patients suffering from exstrophy of the bladder. Of these, 15 were not operated on, as some were too young, and others did not return for operation. Six patients were operated on by the plastic method, and 1 died six months later. These patients were operated on by the Maydl-Moynihan method, and 2 died in the hospital of uræmia. Thirteen were successfully operated on by the transplantation method, with 1 death. One died of pneumonia a few weeks after leaving the hospital, 1 of pulmonary tuberculosis three years after operation, and 1 after a similar period from typhoid fever.

H. A. Fowler³ describes a case in which he diagnosed syphilitic cystitis. There was acute cystitis with ulceration resembling a tuberculous ulcer. No tubercle bacilli were found, but he mentions bacteria in the urine. The cystitis cleared up under general antisyphilitic treatment. He reviews the literature.

Bladder Tumour.—Barringer⁴ relates his experiences of Radium treatment of bladder and prostatic carcinoma. In a large majority of cases of bladder carcinoma the hæmaturia ceased in two or three days after the treatment. In some cases a very rapid disappearance of the growth takes place. Radium

PLATE VII.

INJURIES OF THE BLADDER



Through-and-through wound of bladder produced by shell fragment. The entrance wound is larger than the exit, probably on account of the in-driven bone being retained in the bladder. The exit wound involved the peritoneal cavity at the lower part of the rectovesical pouch, and communicated with the rectum. Note the ecchymosis of the bladder wall and the superficial necrosis of the mucous membrane. The missile had passed through the pubic bone, bladder, rectum, and sacrum, and lodged in the tissues behind. Death took place from gas infection in the track six days after injury.

burns of normal portions of the bladder wall occurred only in cases where the carcinoma was situated at the neck of the bladder, and in which the radium was pulled out into the urethra and remained there a long time. Twenty-five cases of bladder carcinoma were treated, of which only 2 would be considered good subjects for operation, the others all being advanced. In 4 of the 25 cases the radium caused disappearance of the growth, the duration of cure being ten and a half months, five months, and there was one recent case. One had a slight local recurrence. The author considers good results depend on early treatment and direct application of the radium to the growth.

Thirty cases of carcinoma of the prostate were treated with radium. The reduction or disappearance of carcinomatous nodules occurred with "surprising regularity." The early cases, where the growth was confined to the prostate, showed shrinkage of the carcinoma, but very few advanced cases showed any improvement. The reduction in size was believed to be permanent, but the longest period under observation after treatment was fifteen months. Of 30 cases of prostatic carcinoma, 19 were advanced, and in only 2 of these was there any improvement. Eleven cases were in an early stage, 6 of which were "distinctly better," and the remaining cases too recently treated to be of value.

Sabatini⁵ treated 31 cases of bladder tumours by the **Bipolar High-frequency Current**. The cases were mostly tumours of small and medium size, and pedunculated—the only classes of tumour the author considers should be thus treated. The number of applications cannot be determined beforehand, and do not depend on the size of the tumour. Each treatment should not exceed five or six minutes, and there should be an interval of not less than fifteen days between each treatment. The intensity of the current varies from 250 to 300 ma., and should not exceed 350 ma. In large tumours the method may be attempted with the view of diminishing their size and preventing hæmaturia.

Wounds of the Bladder.—Emergency treatment of wounds of the bladder and urethra was discussed at a meeting of the chefs de service of the urological centres in France.⁶ The ideal treatment by suture of the wound was only rarely possible, and its results are not what should properly be expected. Emergency cystotomy appears to be the best treatment for wounds of the bladder. Colostomy for vesico-intestinal fistula is useless in the majority of cases, and has only very limited indications. Immediate suture of urethral wounds is a long and delicate operation, and should not be done without at the same time draining the bladder suprapubically. Simple suprapubic cystotomy with free opening up of the injured area suffices in the majority of cases.

Treatment of wounds of the kidney and ureter at the front and at the base was also discussed. Immediate intervention is only indicated in the presence of a large hematoma, and of an intrarenal projectile. The escape of urine by the wound does not in itself justify nephrectomy. When intervention is decided on it should be as conservative as possible, and nephrectomy should only be performed where absolutely necessary.

At the base the principal operations are: the extraction of foreign bodies, however small; operation on purulent non-urinary fistulæ, for urinary fistulæ that have persisted in spite of non-operative treatment, nephrectomy being usually necessary; in pyuria, when treatment by ureteral catheter has failed, temporary nephrotomy is called for.

Cathelin⁷ describes 29 cases of wounds of the bladder by bullets and shell fragments. Five of these injuries involved the rectum, and 3 were associated with fracture of the pelvic bones. In 17 cases urine was discharged by the wound; in 7 there was retention of urine; in 11 cases hæmaturia, and in 5 cystitis. Immediate suprapubic cystotomy is recommended in the following: (1) Serious hæmaturia from anterior perforation or by posterior perforation

without exit ; (2) Peritonitis ; (3) Associated lesions of the rectum. Foreign bodies do not require immediate intervention, but a permanent catheter is always advisable. Many injuries operated from the front result in fistula and require secondary operations. In the author's cases there were 26 recoveries and 3 deaths.

Fullerton⁸ draws the following conclusions from a study of 53 cases of bladder injury in warfare. Injuries of the bladder form a very small proportion of the total wounds reaching the base hospitals, and their importance depends largely upon associated injuries. The usual associated injuries are those of the bones of the pelvic girdle and of the pelvic viscera, the most frequent being the rectum. In cases reaching the base, the mortality of bladder injuries is 30 per cent, the chief causes of death being pelvic cellulitis, peritonitis, and sepsis. The chief sequelæ are necrosis of bone, cystitis, calculus, and stricture of the neck of the bladder. Accumulation of fluid or fæces in the pelvic cellular tissue should be prevented, and suprapubic cystotomy done where required. The paper is finely illustrated, and *Plates VII and VIII*, kindly lent by the *British Journal of Surgery*, are typical examples of these injuries.

Crosti⁹ collected 45 cases of rectal lesions ; among these, 14 had a lesion of the bladder and 2 of the posterior urethra. In the treatment of these cases, the object is to prevent infiltration of urine and subsequent infection. Although in some cases a *sonde à demeure* may suffice, in others cystotomy and colotomy are necessary. The track of the projectile is widely opened up. If the urinary infiltration cannot be reached on account of the bone of the pelvis, it should be drained by a transverse perineal incision. The formation of a permanent artificial anus is recommended, but in the majority of cases where a perineal drainage of the infiltrated area has been established, a *sonde à demeure* will suffice without cystotomy.

Cathelin¹⁰ treated 3 cases of suprapubic urinary fistula by inversion of the skin. An incision was made round the orifice of the fistula, and the skin around dissected back. The collar of skin surrounding the fistula was freed, and split transversely, and each half inverted so that the outer raw surfaces were in contact and retained by three silk sutures. A catheter is retained in the urethra for about four weeks.

REFERENCES.—¹*Surg. Gyn. and Obst.* 1917, Oct., 382 (abstr.); ²*Jour. Amer. Med. Assoc.* 1917, Dec. 22, 2079; ³*Jour. Amer. Med. Assoc.* 1917, Oct. 27, 1399; ⁴*Boston Med. and Surg. Jour.* 1917, Sept. 27, 444; ⁵*Surg. Gyn. and Obst.* 1917, Nov., 182 (abstr.); ⁶*Presse Méd.* 1917, Dec. 13, 706; ⁷*Lyon Chir.* 1918, Jan.-Feb., 109; ⁸*Brit. Jour. Surg.* 1918, July, 24; ⁹*Surg. Gyn. and Obst.* 1917, Nov., 483 (abstr.); ¹⁰*Paris Méd.* 1918, May 18, 395.

BLIND, WELFARE OF THE.

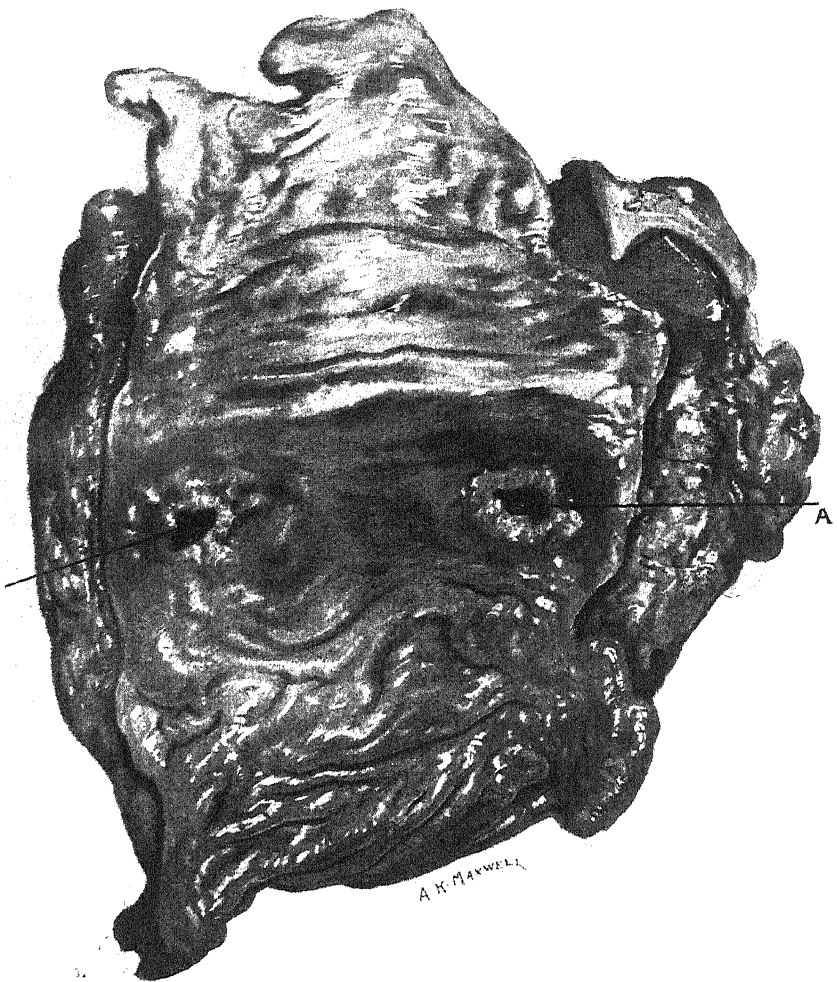
R. Foster Moore, F.R.C.S.

A Departmental Committee¹ was appointed on May 7, 1914, to consider the present condition of the blind in the United Kingdom, and the means available for their industrial or professional training and their assistance. The Committee held 38 meetings and examined 53 witnesses. They find that the recommendations of the Royal Commission of 1889 have been largely neglected. They recommend that a Special Department, whose function shall be the general care and supervision of the blind, shall be set up in the Ministry of Health. £500,000 is necessary for increasing the workshop accommodation by 3000 places. The definition of blindness proposed by the Council of the Section of Ophthalmology of the Royal Society of Medicine is accepted, viz.: "Blindness means too blind to perform work for which eyesight is essential."

The Committee accept the conclusion that ophthalmia neonatorum is responsible for over 10 per cent of the cases, and are satisfied that this can be reduced. They are satisfied, too, that the proportion of blindness caused by

PLATE VIII.

INJURIES OF THE BLADDER—*continued*



2. Rectum from same case as *Plate VII*. Note the ecchymosis of the rectal walls, and the ring of necrosis surrounding the wounds of entrance and exit; also the gangrenous condition of the perirectal tissues.

accident could be reduced, if the wearing of protective glasses were more generally enforced in dangerous occupations.

They suggest that the Government should consider the desirability of increasing the facilities for the higher education and professional training of blind persons, and of extending grants payable in respect of pupils undergoing professional training. For industrial training, the accommodation does not appear to be materially deficient.

The Committee are satisfied that the crux of the problem of the blind in the United Kingdom at the present moment is the inadequacy of workshop accommodation. The work of miscellaneous societies for the aid of the blind would be more efficient if controlled by some central body. They emphatically recommend the provision of books for the blind, and the institution of a central free library aided by a State subsidy. Under the Poor Law the blind should either be granted out-relief, or receive special accommodation in the Institutions. The sum at present available for pensions is wholly inadequate. They are satisfied that blinded soldiers and sailors are adequately provided for at St. Dunstan's Hostel.

In conclusion, the Committee say: "A great nation ought undoubtedly to direct a portion of its resources towards the adoption of wise measures for the relief of the weak and suffering members amongst its citizens. In years to come it should be part of Great Britain's pride, that in these Islands can be studied the best methods for the prevention of blindness, and the best treatment of those whose blindness cannot by any human knowledge or resource be averted."

REFERENCE.—¹*Brit. Jour. Ophthalm.* 1918, Jan., 29 ("Report of the Departmental Committee on the Welfare of the Blind").

BLOOD-PRESSURE, influenced by Adrenalin (*p.* 2).

BLOOD-VESSELS, SURGERY OF. (*See* HEART AND BLOOD-VESSELS.)

BOILS. (*See* SKIN, STAPHYLOCOCCAL INFECTIONS OF.)

BONE, AFFECTIONS OF. Effect of Phosphorus on (*p.* 6). The *x*-ray section might also be referred to (*p.* 33).

BONE AND CARTILAGE GRAFTING. *E. W. Hey Groves, M.S., F.R.C.S.*
C. A. Joll, M.S., F.R.C.S.

The field for bone grafting has been widened to an extraordinary extent as a result of the numerous ununited fractures which have occurred during the war, but the published results have not been numerous, probably because many of the cases are still not in a fit stage for the operations to be done, for everybody admits that success is dependent on a state of absolute asepsis, not only on the part of the surgeon but in the patient. In order to fulfil the latter condition, it is often necessary to wait many weary months before the operation can be undertaken with reasonable hope of success, as sepsis in and about old compound fractures and similar injuries lurks with aggravating tenacity. The practical value of bone-grafts had been well established long enough ago, but the fundamental points on which it is based—viz., the method of bone regeneration, the exact elements of the bone which survive in a graft, and allied problems—are still matters on which there is no general agreement; though, on the other hand, there is no lack of authors expressing very definite opinions on these questions.

Berg and Thalhimer,¹ in their study of bone regeneration, give a *résumé* of our knowledge of the development, growth, and structure of normal cartilage

bone, emphasizing these features: (1) All cartilage bone is produced by cells arising from the osteoblasts lining the periosteum, and is deposited in pre-formed cartilage, the latter being absorbed; (2) The endosteum is formed of osteoblasts which arise from those lining the periosteum, and osteoblasts also extend from the endosteum and the osteoblastic (cambium) layer of the periosteum into the Haversian system; (3) Cartilage which is about to be ossified undergoes certain changes, among them an enlargement and flattening out of its cells, with their arrangement into columns at right angles to the plane of bone growth; (4) Bone cells (not osteoblasts) are enclosed in bony lacunæ which intercommunicate by means of canaliculi; (5) None of the bone-cells are in contact with blood-vessels, and their nourishment is by plasma through the canaliculi; (6) Young lacunar cells which have just been formed from osteoblasts can divide and form a very limited amount of bone; (7) Fully-developed bone-cells have no power of bone-formation, i.e., they cannot act as osteoblasts; (8) They state briefly the various opinions held as to the fate of the transplant. Ollier's conclusions (1867) were that autogenous periosteum-covered grafts survived owing to the rapid vascularization of the periosteum from the surrounding tissues, and that increase of thickness occurred owing to the activity of this periosteum. All other kinds of grafts of bone, if not already dead, soon die and become mere foreign bodies, and either remain encapsuled or become absorbed; and if in contact with healthy bone, the latter may, under favourable conditions, replace the graft. Radzimowski and Bonome, working independently, came to the conclusion that when a periosteum-covered graft was used, the bone died but the periosteum lived, and itself formed new bone, which may replace the dead bone of the graft. Barth (1893) came to the conclusion that the bone and the periosteum both die in the transplant, and he concluded that it is immaterial whether bone, living or dead, covered or not by periosteum, was used in grafting operations. He regarded the transplant as a sort of splint to be replaced gradually by bone formed from surrounding tissue. Surgical practice was so powerfully influenced by these views of Barth's, that macerated or decalcified bone became the material chosen as a routine for grafts, though a few years' experience showed that such grafts were in practice inferior to the living autoplasmic graft. Axhausen repeated the work of Ollier and Barth, and concluded that in the autogenous periosteum-covered graft the bone itself does not survive, but that the periosteum does, and that the latter is the source of the new bone. He confirmed the opinion of Ollier that heteroplasmic grafts do not survive. Axhausen held that it is because of the intimate vascular connection which is established between the transplanted periosteum and the bed in which the graft lies, that the bone transplanted is so closely bound to the tissues around, and not, as in periosteum-denuded grafts, only loosely attached. He believed that the marrow was of no importance in the graft. Macewen (1912) claimed that periosteum is merely a limiting membrane, that it has no bone-forming capacity, but has a confining function and prevents overproduction of bone. Berg and Thalhimer maintain that Macewen's claims are rendered convertible, because they were not based on a careful histological control of the experiments, and that too much value was attached to macroscopic and x-ray evidence. Mayer and Wehner hold that the specific osteoblastic cells, whether from periosteum, Haversian system, or endosteum, are capable of reproducing bone, but that the actual bone-cells had no such ability. They found that free transplants of bone-cortex form new bone in virtue of the osteoblasts in the Haversian canals, and that there is no metaplasia of the connective tissue in the neighbourhood for bone-forming purposes. The replacement of old bone by new bone they believe to be by a process of creeping replacement,

and also by absorption and substitution. Berg and Thalhimer experimented with the object of determining exactly the fate of the various bone elements, transplanted either singly or together, and under what circumstances they formed new bone. Autogenous grafts from the tibia of the cat were used in these experiments, and in all cases primary union was secured. A few free grafts into the spleen were tried, but the majority were placed on the costal cartilages, either freed of perichondrium or cut away to provide a bed for the graft, which in all cases was fixed in position by silk sutures passing round the whole cartilage and the graft. From the results of these experiments they draw the following deductions: (1) Periosteum, devoid of adherent bone-cells, produces bone when transplanted into foreign tissues; (2) Endosteum and osteoblasts lining Haversian systems in bone transplants produce bone very actively; (3) The cambium layer when adherent to transplanted cortex produces bone; (4) Some bone-cells in transplants are able to persist for almost a year, but most of the bone is absorbed; (5) Fully developed adult bone-cells do not reproduce themselves or form bone; (6) Very young lacunar cells can reproduce themselves and form bone; (7) Transplanted bone is absorbed not only by osteoblasts but also by the direct action of growing young bone, and the transplanted bone is replaced either by a creeping forward of the new bone or a gradual extension or expansion of the new bone into the transplant; (8) Marrow spaces and red marrow are formed in the bone which develops from transplanted periosteum.

Brooks,² using a special stain which, given by the mouth or subcutaneously, stains *in vitam* newly-formed bone, carried out a series of investigations on dogs, excising the whole thickness of the shaft of the ulna together with the periosteum, and inserting the transplant in the gap by wedging it into the medullary canal. The grafts were always obtained from the femur. He claims that the results of these experiments show conclusively that a defect in the shaft of a bone may be quickly and completely regenerated by means of a peri- and end-osteal-bearing living autoplasmic graft; that the regeneration of the bone to repair the defect originates in portions of the normal bone which remain viable; that the transplanted bone ultimately loses its identity as a result of replacement and absorption by new bone; that if the periosteum and endosteum are removed from the transplant together with the adjacent layers of bone, it has no osteogenetic powers. If an implant of sterile dry bone be used, there is no evidence that it helps in any way the regeneration of the defect, neither acting as a stimulus to metaplastic bone-formation in the neighbourhood, nor helping to conduct bone across the defect. He concludes that the only type of bone-graft admissible is one provided with periosteum, and if possible endosteum as well, and he believes that the periosteum acts as an actual bone-former, especially in its deep layer or cambium.

Carter,³ whose conclusions are based on purely clinical evidence, holds that even when mild sepsis results (he is dealing with the face and nose), the result is not necessarily a failure; that a transplant stripped of periosteum, placed in the soft tissues of the nose, remains alive and is not absorbed; that the periosteum-covered graft is osteo-conductive and osteogenetic, and is not absorbed; that the periosteum does not by itself reproduce bone.

Gallie and Robertson⁴ take the view that, although the majority of the cells of an autoplasmic graft die soon after they are transplanted, a certain number which are able to get nourishment from the plasma of the grafter survive, and carry on their osteogenetic functions. They hold, too, that it is a mistake to use the denser types of bone for the purpose, and that the more porous the graft, in reason, the better, because the easier will it be for the plasma to gain access to the cells of the transplant, and the more of the latter will survive. In

operating on a long bone, they favour using one stout graft sufficient for firm fixation of the fragments, and to add to this one or more thin strips of bone which will provide a large superficies for vascularization and osteogenesis. They accept Macewen's and Hey Groves's view that the periosteum is not an

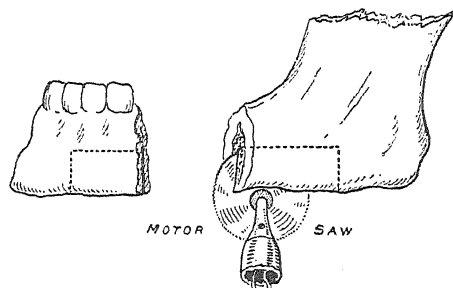


Fig. 40.—Application of motor saw in operation for closing gap in mandible produced by gunshot wound.

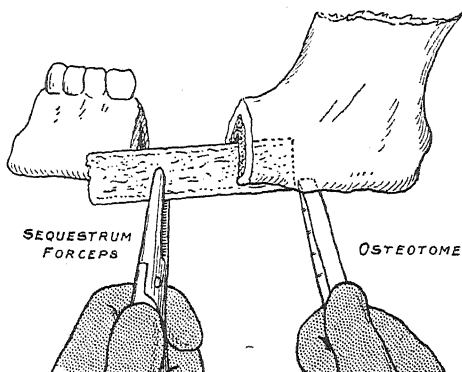


Fig. 41.—Insertion of half of split rib with smooth side toward the mouth cavity.

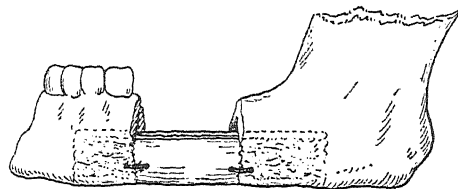


Fig. 42.—Completion of operation by the placing of the other half of the rib in contact with the first half, between the ends of the fragments, and by the fastening of all in place with kangaroo tendon. (Figs. 40-42 are redrawn from the 'Journal of the American Medical Association'.)

osteogenetic layer, and that it is not necessary in grafting. They tested the effect of boiling the autoplasmic graft in a certain number of cases, and they conclude that such grafts are replaced by invasion and vascularization from the adjacent bone; and so satisfied are they with these cases that they use

them in preference to metal plates and screws. They give as a reason for the use of these rather than autoplasmic living grafts, that the boiled ones can be prepared beforehand and cut to any size and shape, but such grafts must of course be heteroplasmic ones. They warn against the assumption that bone-grafting is always successful, as they admit that failures are common whatever the technique. For fractures of the mandible, these authors make saw-cuts along the lower margin of the fragments, 1 to 2 in. long and $\frac{1}{2}$ in. deep, of course avoiding the buccal cavity and the teeth sockets, and then with an osteotome the fragment is split to allow the graft to be wedged in between. An interdental splint which has been previously prepared is now cemented in position. The graft is then made from the rib by resecting 3 in., which is then split, and half of the graft driven into the gap with the smooth side inwards. To fill the depression still left just where the graft bridges the fragments, the remainder of the rib is cut to fill in this space, and the whole firmly fixed with kangaroo tendon passed through drill holes (*Figs. 40-42*). (*See also JAWS AND FACE.*)

Heitz-Boyer and Scheikevitch⁵ consider that their experiences of war surgery enable them to state that periosteal ossification in the adult is a passive phenomenon, that it is the underlying bone which is the actual source of the osteoblasts, and that irritation and inflammation are the stimuli to the formation of the new bone in the case of war lesions. They affirm that the faculty of ossification is not specific; that all conjunctive tissues have the power to some degree; but that the periosteum is of great value as a vascularizing and limiting membrane. Their dictum is therefore that osseous regeneration in adults is essentially a pathological phenomenon, inflammatory in nature, and that it differs entirely from physiological bone-formation. On this groundwork they base the following practical applications:—

1. It is unwise to practise the extensive 'esquilectomies' at an early stage, as recommended by the Lyons school, as it is only when the inflammatory processes have acted for a considerable time that sufficient bone-formation has occurred to fill up the gaps and the interstices.

2. As a logical outcome of this, they claim that Tixier's method of treating pseudarthrosis, by introducing a mild infection so as to stimulate osteogenesis, is to be regarded as a serious addition to our resources in the treatment of these cases. They add, too, that the use of plates in the early stages of compound fractures is justifiable on the same grounds.

3. On the subject of grafts, they claim that a mild degree of infection is beneficial to the chances of rapid success of the transplant, but they do not go so far as to suggest that deliberate attempts to introduce this should be made. They consider that the periosteum is not necessary to the success of the graft, and they quote Delbet's results in the case of the neck of the femur, and their own in a case of a gap in the tibia of 2 in. or more, in which a perfect result was obtained with an aperiosteal graft.

Mamourian,⁶ basing his conclusions entirely on clinical evidence taken from operations on young subjects, claims that all the graft does is to supply the biochemical stimulus or irritant which has been abolished by trauma or disease, the new bone being formed by the diaphyseal ends, from periosteal and bony remains in the shaft zone, and in the young by epiphyseal lengthening. He thinks that dead bone acts in the same way, but not nearly so efficiently.

Bérard⁷ gives a study of the bone-graft in cases of loss of substance in the tibia. He admits that some of the cases were those in which extensive 'esquilectomies' had been done, and warns against this practice, particularly at an early stage. Bérard divides his cases into two groups: (1) The loss of substance is so great that spontaneous bridging of the gap cannot be expected; (2) Early esquilectomy has left two fragments with tapering ends and a gap

between of a limited width. In this second group it is reasonable to wait eight to ten months before concluding that union is impossible. Bérard prefers to take the graft from the injured bone if possible, and he does not use the Albee saw but a chisel and mallet, and he retains or discards the periosteum indifferently, while admitting that the latter practice may lend itself better to the internal splint and may be absorbed. The graft is firmly fixed between the bone-ends by pointing these and fixing them into the medullary canal, or by making a groove for the ends of the graft to fit in tightly. In difficult cases he uses wire to ensure fixation. Two of the cases suppurated slightly, but the grafts remained *in situ* and did well. Bérard considers that these grafts act partly in virtue of the living cells of the graft, and partly as Mamourian describes above. Radiographs of some of the cases are reproduced, and this author describes the graft passing through an initial stage of rarefaction, followed by slow condensation of the bone until it reaches the density of normal bone. Other authors deny that any definite conclusions can be drawn from the *x*-ray studies, and say that, in fact, it is possible for a completely dead graft to show a normal shadow, and vice versa.

Imbert¹³ gives a *résumé* of his experience with bone-grafts, and among his conclusions are these: (1) The end-result of a graft cannot be determined definitely until years after the operation; (2) A latent power of osteogenesis exists in all pseudarthroses, and various stimuli have the power of awakening this slumbering power—the best of these methods is the osseous graft; (3) To obtain the best results, avoid fixation of the graft with wires and other metallic supports.

Davidson⁸ describes a method of treating fractures of the great tuberosity of the humerus by drilling two holes through the fragment and into the head of the humerus, then cutting a piece of tibia a little less than 2 in. long and about $\frac{1}{2}$ in. thick, splitting this to make two pegs, and rounding the edges, then inserting these pegs into the holes in the tuberosity and head of the bone so as to make an accurate fit. The result was in this case perfect.

Delbet⁹ gives an account of his method of treatment in cases of so-called extracapsular fracture of the neck of the femur. The grafts are cut about $2\frac{1}{2}$ to 4 in. long, and completely denuded of periosteum. He claims that the grafts live, because *x*-ray plates at intervals up to two years reveal a normal shadow, and also because in those cases where the graft has become fractured from any cause, it becomes consolidated anew. In recent pseudarthroses new bone is produced between the surfaces of the fracture, and in some cases the neck is completely restored. Rapidity of functional restoration depends on the age of the false joint and the degree of the muscular atrophy; to avoid the chance of failure it is better to operate at the same stage as one deals with simple fractures of the femur. In old cases the interfragmentary space is wider, and therefore a greater strain is put on the graft and it is more likely to become fractured; but the oldest cases are worth treating on these lines, as success may be achieved in the least promising. Delbet treated 14 cases, and 13 could walk easily afterwards, while only one was a complete failure.

Cartilage Grafting.—Leriche and Policard¹⁰ deal with the allied question of cartilage grafts. Ollier denied the power of cartilage deprived of its perichondrium to live as a graft, and they conclude similarly in the two cases they were able to examine histologically at intervals of 36 and 302 days after the original grafting. They claim that it is only the fibrinocartilaginous and fibrous portions of the graft which survive, and that the strictly cartilaginous part is slowly absorbed, being invaded gradually by new connective tissue originating from the surviving perichondrium.

Villandre¹¹ has used these cartilaginous grafts in a large number of cases,

particularly in large cranial defects after gunshot wounds, etc. He gives a series of indications for this procedure, but they do not appear to be convincing, as it is well established that the disabilities which follow these injuries are rarely due to the actual cranial defect, but are the result of the underlying cerebral lesions. For these cranial gaps he cuts square pieces of cartilage from the patient, and fixes them securely to the pericranium by catgut. He prefers several small grafts to a few large ones, as they adapt themselves better, he says, to the configuration of the cranial contours. This author reserves judgement as to what actually happens to the graft histologically. In a further series of cases he treated the gaps by means of osteoperiosteal grafts, i.e., the type recommended by Delagenière, which consist of the tibial periosteum raised so that scales of bone remain attached to its deep surface. With these he claims 100 per cent of successes. Plates of sterilized bone obtained from the sheep were also tried, but with less satisfaction.

Imbert, Lheureux, and Rouslacroix^{12 13} studied the changes which occur in heteroplastic grafts, and conclude that they are rapidly attacked by the leucocytes and transformed into fibrous tissue.

REFERENCES.—¹*Ann. Surg.* 1918, May, 331; ²*Ibid.* 1917, Dec., 635; ³*Ibid.* Aug., 162; ⁴*Jour. Amer. Med. Assoc.* 1918, i, 1135; ⁵*Presse Méd.* 1917, Oct. 18, 603; ⁶*Brit. Med. Jour.* 1918, ii, 79; ⁷*Presse Méd.* 1918, Mar. 4, 113; ⁸*Ann. Surg.* 1917, July, 97; ⁹*Surg. Gyn. and Obst.* (abstr.) 1917, ii, 233; ¹⁰*Lyon. Chir.* 1917, Sept.-Oct. 916; ¹¹*Med. Press*, 1918, i, 429; ¹²*Surg. Gyn. and Obst.* (abstr.) 1917, ii, 420; ¹³*Presse Méd.* 1918, May 9, 233.

BONE GRAFTS. (See also JAWS AND FACE.) W. I. de C. Wheeler, F.R.C.S.I.

Fuld¹ uses bone transplantation in the surgical treatment of paralytic feet. To assure stability and prevent lateral deformity of a flail ankle, a bone graft is passed through both malleoli and the body of the astragalus. He points out that tendon transplantation in these cases is disappointing, and that arthrodesis leaves an imperfect result. A short curved incision is made from a point behind the internal malleolus, below its extremity, and terminating in front of it. A similar incision is made over the outer side, the joint is then opened, and the foot displaced inward, so as to force the astragalus between the malleoli. The cartilage on its upper and lateral surfaces is removed. The foot is now forced downwards, and the cartilage of the tibia and fibula is likewise removed. A hole is made with a $\frac{1}{4}$ -in. drill passing through both malleoli and the body of the astragalus. A tibial graft of the proper size is then taken, and is inserted into the canal, the anterior and lateral ligaments are sutured, and the wound is closed. The limb is fixed in plaster-of-Paris dressing for eight or ten weeks.

Wheeler² draws attention to some problems in connection with bone grafts, and deals with the operative treatment of old fractures and those complicating gunshot wounds. From a study of thirty cases, he concludes:—

1. Whatever the histological rôle, the clinical usefulness of a bone graft is not affected.

2. The final success of bone grafting in cases in which a gap is bridged depends upon the operation of Wolff's law (*Plate XI, E*)—that is, the graft, stimulated by strains and stresses, changes its internal architecture and external conformation until the required strength is attained. In other words, "the amount of growth in a bone depends on the need for it" (Murphy).

3. The periosteum should be left on the graft, because, although not essential, it is the medium through which new blood-vessels enter the graft and the surrounding structures. Furthermore, in removing the periosteum, superficial layers of osteoblasts may be sacrificed. A periosteum-covered graft is less likely to become rapidly absorbed.

4. To provide the necessary strains and stresses, it is advisable to allow the graft to functionate as early as possible, but in most cases preliminary fixation for three months is essential.

5. In old ununited fractures with false joints, the bone in the critical area (near the site of fracture) is sclerosed and avascular, and makes an unsuitable soil for that portion of the graft in contact with this area. Growth in the graft is impeded by the surrounding sclerosis. Dense sclerotic bone has no osteogenetic power.

6. In such cases a periosteal-covered graft, instead of exhibiting osteogenetic powers and responding to Wolff's law, may become attenuated and absorbed or break in the critical area five or six months after operation.

7. In the same class of case, very prolonged fixation is particularly unfavourable to osteogenesis, to the establishment of blood-supply, and bony union. Early movements and the bearing of mechanical stress and strain, on the other hand, may lead to yielding of the graft and failure. The problem is a difficult one in the case of the humerus or femur, where strength is essential from the commencement of treatment, but may be solved by wide resection of the sclerosed bone, and resignation on the part of the patient to a short limb.

8. But for slightly slower osteogenetic powers, and a real tendency to fracture, the intramedullary peg is effective. This method of bone grafting is satisfactory in the case of the radius and the ulna.

9. In the case of the humerus and femur, long stout inlay grafts give the best results. Sliding grafts should only be employed in simple and fresh cases.

10. The bone graft has inherent bacteria-resisting properties.

11. Absolute fixation of the graft in its bed, either as part of the operation, or afterwards, by splints or plaster, is essential to success.

12. Bone grafting for spinal caries is followed by more uniformly successful results than are seen elsewhere. This is to be expected, since both the graft and the recipient bed (in the region of the spinous processes) consist of healthy bone.

13. As in the operation of tendon transplantation and nerve suture, the operation of bone grafting should be preceded by correction of any existing deformity and by the freeing of adhesions in neighbouring tendons and joints.

The paper deals with Wolff's law, the frequent occurrence of accidental fracture of peg grafts, and the absence of osteogenetic powers in sclerosed bone. Some of the points dealt with are shown in *Plates IX-XI, kindly lent by the 'British Medical Journal.'*

REFERENCES.—¹*Ann. Surg.* 1918, Feb., 163; ²*Brit. Med. Jour.* 1919, i, 119.

BONE SINUSES. (*See ORTHOPÆDIC SURGERY.*)

BRAIN SURGERY OF. (*See HEAD.*)

BREAST, CANCER OF.

W. I. de C. Wheeler, F.R.C.S.I.

Willy Meyer¹ discusses the advisability of removing both pectoral muscles *en masse* in the radical operation. He points out that after extirpation of the two muscles, the combined work of the serratus anticus major, teres major, and the two rhomboids assumes their function. One of the generally accepted laws in operation for carcinoma is to keep a reverential distance from the seat of the disease—in other words, to work within healthy tissue as far as possible, and try to lift out the tumour *en masse* with lymph-vessels and lymph-glands. Such a result can be easily obtained in early cases of cancer of the breast. After describing his radical operation, he deprecates the removal of the supra-

PLATE IX.

BONE GRAFTS

(W. L. DE C. WHEELER)



Fig. A.—Bones of forearm on admission. Great angular deformity and shortening.

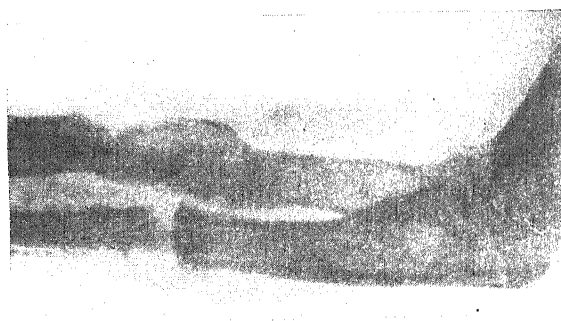


Fig. B.—Reconstruction of forearm shown in Fig. A, by resection of bone, plate, and wires *en bloc*, and bridging of gaps with intramedullary pegs. The radial peg increased in diameter to size of normal radius after six months.

PLATE X.

BONE GRAFTS--*continued*



Fig. C.—Gunshot wound of lower end of humerus before operation. Temporary musculospiral paralysis disappeared *pari passu* with the healing of the wound three months after injury.

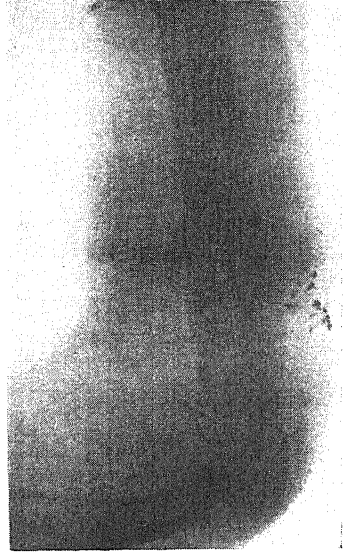


Fig. D.—After operation. Introduction of a peg graft four months after healing was followed by fighting up of latent sepsis in the old wound. The graft survived, firm union followed, with full movements at the elbow-joint.

PLATE XI.

BONE GRAFTS—continued



Fig. H.—Union of tibia and fibula. Note thickening of fibula, the result of weight-bearing, fixed functional rest.

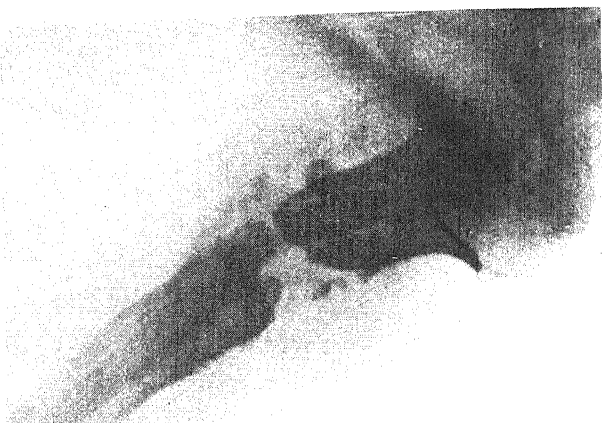


Fig. K.—Illustrating fracture of prox. graft in old fracture of humerus. These cases should be treated by shortening and bony grafts on the step operation.

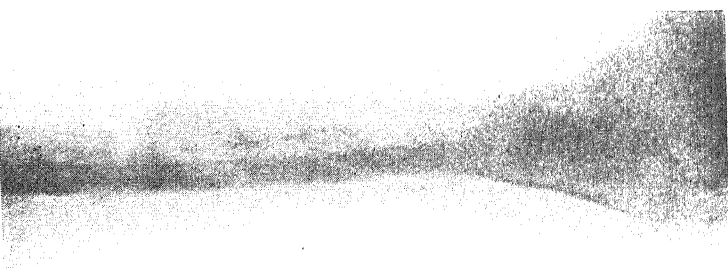


Fig. G.—Long bony graft in an ununited fracture of humerus of eight years' standing. Six months after operation there was absorption of the graft in the critical area, and failure of union.

clavicular glands, although this procedure is theoretically correct. This extension of the operation should only be performed if there is a shadow of doubt that the disease has reached the neck. Both pectoral muscles should be completely excised from their insertion to their origin, and in doing this the lymphatic system in and between them is left undisturbed. The preservation of the clavicular portion of the major pectoral muscle is undesirable, and leaves no advantage behind. The total extirpation of both pectoral muscles in their undisturbed and uninvaded anatomical connection in relation to the breast offers an additional safeguard, not only against local and regional occurrences, but in all probability against metastasis. Total extirpation of both pectoral muscles in every case is logical, and is a surgical procedure clearly indicated, particularly in view of the possible lymphatic arrangement between the two muscles.

REFERENCE.—*Ann. Surg.* 1918, July, 17.

BRONCHOSCOPY.

P. Watson-Williams, M.D.

Chevalier Jackson¹ describes a new method of working out difficult mechanical problems of bronchoscopic foreign-body extraction where none of the ready-made instruments will exactly meet the requirements. He has a mannikin consisting of a piece of rubber tubing of the size of the involved bronchus, so that he can reconstitute the problem of the particular body to be extracted, and then shapes his own probes or instruments accordingly. An illustration (*Fig. 43*) is given by Jackson showing how he was enabled to close an open bar-pin in the trachea of an infant aged four months, and to remove the pin successfully. He points out that care is needed to avoid forming hooks that could catch in the bronchi or become entangled in the foreign body, and that the shape should be such as to favour 'unscrewing out' if caught.

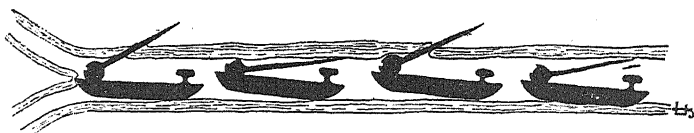


Fig. 43.—Diagram showing how a bar-pin was pushed down by ill-advised alternate pushing and pulling until it had been forced into the lowest possible position.

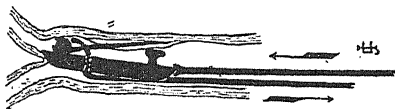


Fig. 44.—Diagram showing Chevalier Jackson's method of closing a bar-pin.

Lynah² reports cases illustrating the value of suction in removing obstructing *diphtheritic casts* by means of direct bronchoscopy and suction, and also the value of direct bronchoscopy in cases presumed to be diphtheria only, but in which the true cause of dyspnoea is a foreign body, and vice versa. Obviously under such circumstances the differential diagnostic advantages of bronchoscopy are of the greatest value, and may enable life to be saved, and cases are reported in proof of this contention. Further, the cases reported demonstrate the fact to which Chevalier Jackson has called attention, that bronchoscopy can be performed without anaesthesia in adults and in children. Lynah says, "Of course no case of diphtheria should ever be anaesthetized

for the removal of membrane" by bronchoscopy. Small doses of morphine and atropine may be used, as these drugs, especially morphine, are the very best heart stimulant we have for this disease, while the atropine removes the greater part of the secretion, which without it is often profuse.

REFERENCES.—¹*Laryngoscope*, 1917, Oct., 725; ²*Ibid.* 734.

BURNS. (See also SCARS, UNSTABLE.) *E. Graham Little, M.D., F.R.C.P.*

MacLeod,¹ under the designation of the 'open method,' thus describes the treatment he recommends: No dressings are employed, but the raw surface is exposed to the air and simply powdered over with a bland **Aseptic Powder** of this formula: Stearate of zinc 20 per cent, magnesium carbonate 40 per cent, lycopodium 5 per cent, diamatos 25 per cent, paraffin 10 per cent, ol. citronnel q.s. This powder is applied from time to time by means of a dredger or insufflator, until the scab becomes a coarse, uneven, yellowish-green crust, a quarter of an inch to half an inch or more in thickness. Once formed, the scab should be left alone and allowed to dry up, crumble, and separate naturally. Should the discharge beneath it be excessive, it may be necessary to remove a small portion, bathe away the sero-purulent fluid, and re-apply the powder. Although this treatment may be employed in burns of the second degree, and in the early stages of those of the third degree before the eschar has separated, it is of greatest value when all dead tissue has sloughed away and a raw granulating surface is left.

REFERENCE.—¹*Pract.* 1918, Feb., 124.

W. I. de C. Wheeler, F.R.C.S.I.

Lee and Furness¹ state that the treatment of burns with ambrine or other paraffin-wax preparations has some serious imperfections. The wound secretions are accumulated in an impervious film of wax, and there is therefore a pus poultice on the granulating surface. They recommend a modified open-to-the-air treatment. The entire burnt area, and a generous portion of the surrounding skin, should be covered with a single layer of open-meshed mosquito **Netting previously impregnated with Paraffin Wax**. The paraffin netting is held in place by a gauze bandage, or narrow strips of plaster over the edges of the uninjured skin. This acts as an ideal sterile scab, with drainage through the large open meshes. Before the paraffin net is put in place, the burnt area should be sprayed with 1 or 2 per cent **Dichloramine-T in Chlorinated Melted Paraffin Wax**. It can be applied again if necessary without changing the mosquito netting. The burnt parts are exposed to the air as much as possible. If, in addition, a cradle on which two or three ordinary electric light bulbs are suspended is placed over the wound, healing processes are benefited. The writers state that the paraffin netting should be made as follows: A good quality of mosquito netting, with a mesh of about $\frac{1}{16}$ in., is cut into strips 4 in. wide and 6 in. long. These strips are wrapped in muslin covers and sterilized in the usual way. The netting is usually supplied starched or sized, and it is best not to wash this out. When sterilized, these strips of mosquito netting are dipped into thoroughly melted wax which has a melting point of 45° to 50° C. The melting of the wax should be done over a water-bath. The strips should be handled with sterile forceps; they are held over a tray and allowed to drain out, so that every mesh is clear. After this the strip is cooled for a few seconds in the air, and again wrapped up in the sterilized muslin cover, and so kept ready for use.

REFERENCE.—¹*Therap. Gaz.* 1918, May 15, 305.

CALCULUS. (See BLADDER, KIDNEY, URETER.)

CANCER. (*See under various organs.*)

CANCER, COBRA VENOM IN THE DIAGNOSIS OF.

Herbert French, M.D., F.R.C.P.

It seems almost too good to be true that cobra venom can afford a means of diagnosing cancer by a test carried out on the patient's blood in a way similar to the Wassermann reaction of syphilis; but if Farmachidis¹ results are confirmed by others, there would appear to be at any rate something in the test, and researches in connection with it that are worthy of wide extension. Farmachidis' test depends upon the activation by cobra venom of the hæmolytic action of serum in the deviation-of-complement test, and his assertion is that the test occurs only with serum from persons suffering with malignant disease. When rabbit red-corpuscles were used there was a pronounced positive reaction in 53 out of 64 persons known to be suffering from carcinoma, and in the other 11 there was a reaction also, though it did not occur until after the twentieth hour, so that he did not include them as completely positive cases. On the other hand, in 62 persons suffering from benign tumours, such as fibromata, cystomata, and so on, there was no trace of a positive reaction. He uses 0.1 c.c. of a 1-20,000 solution of cobra venom, and his conclusions are all in favour of the value of the cobra-venom reaction as an aid in the diagnosis of malignant disease. One gathers from his work, at any rate, that if the cobra-venom reaction were positive it would point strongly to the patient having malignant disease, though the contrary would not prove the opposite. The test is as yet little known, and one cannot express any personal opinion upon its value; but one does feel that it should be known more widely, in order that its value may be checked off by the results found by as many different observers as possible.

For the use of **Magnesium** in (*p.* 5). The value of **Diathermy** in inoperable cases (*p.* 21). Radium therapy (*p.* 38).

REFERENCE.—¹*Riforma Medica*, 1918, May 18, 382, and *Jour. Amer. Med. Assoc.* 1918, ii, 320.

CATARACT.

R. Foster Moore, F.R.C.S.

H. Kirkpatrick¹ gives a survey of the work done during the year in the Government Ophthalmic Hospital at Madras. There were 1252 operations for cataract. Of these, 935 were performed by one operator, and of this number, expression of the cataract in its capsule was performed in 45. The author appears to analyze his results with conspicuous frankness. Of the 45 intra-capsular extractions, there were 11.1 per cent of failures, i.e., vision was less than c.f. at 2 metres; the cause of failure in every case was impaction of vitreous subsequent to the operation. The failures amongst the 890 capsule laceration operations, adopting the same standard, were 4.83 per cent. The goggles described below were used instead of a bandage after the first day. Twenty-one dislocated lenses were removed, most of which were the results of couching. In only six was there any loss of vitreous.

The After-treatment of Cataract Extraction by Shield instead of Dressing and Bandage.—Kirkpatrick² recommends aluminium, goggle-like shields (*Fig. 45*) for use twenty-four hours after cataract extraction, instead of continuing with a bandage. On the side of the operated eye, amber glass is included in the goggle; the other side is left open. The disadvantage of a bandage is that the conjunctival sac is converted into a most efficient closed bacterial incubator, whereas, with the goggles, protection is provided, drainage is allowed, the effect on the mental condition of the patient is good, and healing is encouraged by the lid movements and consequent drainage.

Wieden³ gives an account of his experiences of Barraquer's method of

vacuum aspiration extraction of cataract in its capsule. He speaks from an experience of 127 cases, during which he has not had a single operative mishap. The method consists essentially in applying a cupping instrument to the anterior surface of the lens, and by its means drawing out the lens in its capsule. A great advantage claimed for this method, as opposed to Smith's forcible expression, is that there is no fear of loss of vitreous.

Herbert⁴ again urges the advisability of **Perechloride Irrigation** of the conjunctival sac as a preliminary to extraction. The strength advised is 1-3000, the irrigation periods varying from $1\frac{3}{4}$ to 3 minutes in different cases. He states: "Our Indian results leave extraordinarily little room for the explanation of persistent and intractable intra-ocular inflammations on the supposition that they may be of endogenous origin. No notice whatever is taken of bad pyorrhœa or of nasal or throat conditions, etc., yet apparently we do not have reason to regret this."

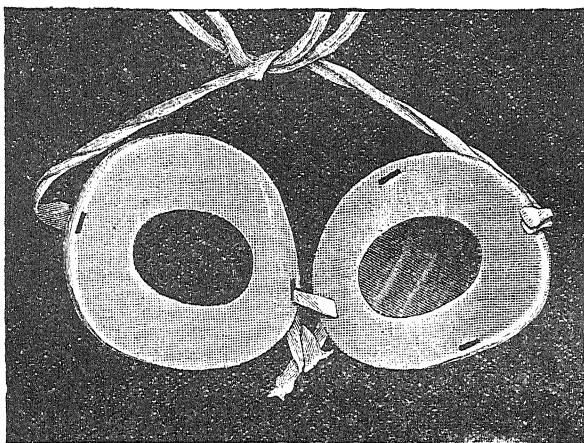


Fig. 45.—Goggles for use after cataract. (Major Kirkpatrick.)

E. A. R. Newman,⁵ in recommending **Irrigation** after extracapsular extraction of cataract, reports a second series of 250 cases, in which 93 per cent were irrigated to remove any residuum of lens. Iridectomy is performed. Secondary needling was necessary in only 2 per cent. Iritis occurred in 5.6 per cent. In the two series, amongst 465 cases which were irrigated, there was loss of vitreous in 2 only. The author states: "I think it may fairly be claimed in the face of these results, that irrigation as I advocate it—with a laterally slotted nozzle, the eyeball free to move in any direction, i.e., not steadied with forceps and the speculum held up—is an eminently safe method. Primary capsulotomy with the point of the knife is, I am convinced, an important prophylactic measure also."

Isaac Levin and Martin Cohen⁶ give details of three cases in which it is stated lenticular opacities were reduced by treatment with **Radium**. The cases were one posterior cortical cataract associated with retinitis pigmentosa, one cataract secondary to iridocyclitis, and one senile cataract in a man of 41, the other eye being normal.

REFERENCES.—¹*Indian Med. Gaz.* 1917, Aug., 277; ²*Ibid.* Nov., 401; ³*Siglo Medico*, lxiv, July 21, No. 3319, 525 (abstr. *Jour. Amer. Med. Assoc.* 1917, ii, 856); ⁴*Indian Med. Gaz.* 1917, Nov., 400; ⁵*Ibid.* Aug., 278; ⁶*N. Y. Med. Jour.* 1918, ii, 4.

CEREBROSPINAL FEVER.*J. D. Rolleston, M.D.*

BACTERIOLOGY.—M. H. Gordon¹ distinguishes four types of meningococci. Type 1 is most frequently observed at the beginning of an epidemic, Type 2 is frequently observed later, and Types 3 and 4 are seen when the epidemic is on the wane. Cases of Type 1 are usually the most severe, although fulminating cases may occur with any of the types. Type 1 apparently represents the normal meningococcus, and Type 2 the parameningococcus. Agglutination tests controlled by the absorption test show that these types are not merely temporary variants of the same micro-organism, but that they are specifically distinct, though closely allied, like typhoid bacilli and paratyphoid A and B bacilli. A case of cerebrospinal meningitis carries only a single type of the meningococcus, and at the onset the same type is in the nasopharynx and in the cerebrospinal fluid. Carriers also have been found to be univalent in type throughout the carrying period.

P. Fildes and S. L. Baker² confirm Gordon's view that all meningococci capable of producing cerebrospinal fever belong to one of four groups, and conclude that an unknown coccus from the throat or elsewhere which does not belong to one of these four groups is not likely to be a pathogenic meningococcus.

ETIOLOGY.—An extensive examination made by G. Mathers and R. D. Herold³ in a large military camp showed that 3 to 6 per cent of the men were meningococcus carriers. The majority, however, were only of the temporary type; only 1 to 2 per cent of the total number of suspects examined proved to be chronic carriers, who were distinguished from the former by often harbouring great quantities of meningococci in the secretions of the nose and throat. The number of carriers was found to be high among those coming in contact with meningitis cases. Of 26,543 non-contact men examined at Greenwich from December 1916, to December, 1917, by Bassett-Smith, Lynch, and Maugham,¹ 1250, or 4.7 per cent, were found to be carriers of the meningococcus, as compared with 2 per cent for the same dépôt from January to July, 1916. That the association of large bodies of men tended to favour the development of carriers was shown by the greater number found among drafts than among new entries. The highest incidence of carriers was in May 1917, after which it fell, and no further cases were recorded up to the end of the period.

P. Fildes and S. L. Baker⁵ discuss the relation of the cases of cerebrospinal fever to the positive contacts. Owing to certain naval regulations they were able to examine the throats of 26 men who subsequently developed cerebrospinal fever. In every case the swab taken at varying times before the onset was negative. They conclude, therefore, that cerebrospinal fever cases are not carriers before the onset of symptoms. The rarity of cerebrospinal fever among carriers is shown by the fact that out of 485 cases interned in one camp not a single one developed the disease. These results indicate that in cerebrospinal fever the cocci pass rapidly to the central nervous system after gaining access to the nasopharynx. According to C. Worster-Drought and A. M. Kennedy,⁶ the mode of entry of the meningococcus is the blood-stream. In ordinary cases the coccus is carried to the meninges by the blood within a few hours without definitely infecting the blood itself, but in some cases septicæmia occurs, and may even prove fatal before meningitis develops. In other instances the meningococcus may invade other structures than the meninges, e.g., the cardiac valves.

F. J. Cleminson's⁷ examination of 47 carriers showed that the accessory sinuses are the main seat of meningococcus infection in carriers, the cavities being often difficult to disinfect, and therefore able to re-infect the upper and

more secluded portions of the nasopharynx, even though these may be swept clean periodically by the antiseptic employed.

In an article on meningococcus carriers in the U.S. Navy, Redden⁸ states that the important factors which change the number of carriers from as low as 1 to 2 per cent among civilians to as high as 20 to 35 per cent among recruits are contact with known cases of cerebrospinal fever, unhygienic conditions such as crowded barracks, severe physical labour with exposure to extremes of heat and cold, and finally, contact with meningococcus carriers. Various measures used to clear up the carriers, such as sprays and steaming, were unsuccessful, but it was noted that during the warm weather a sharp decline took place in the number of positive cultures from carriers.

SYMPTOMS.—As cerebrospinal fever is not primarily a meningitis but a generalized systemic invasion, the term 'meningococcus sepsis' is used in preference to 'epidemic cerebrospinal meningitis' by W. W. Herrick,⁹ who reports an epidemic at the base hospital, Fort Jackson, S.C. In many cases the systemic symptoms appeared from 24 to 72 hours before the involvement of the meninges. In about 75 per cent the earliest sign of diagnostic value was the petechial rash which appeared on the deltoid regions, hips and trunk, extremities, mucous membranes, and face, in order of frequency. The meningococcus could usually be found in the cerebrospinal fluid at the first or second lumbar puncture, and often from 6 to 36 hours before the characteristic symptoms developed or a cellular increase or cloudiness occurred in the fluid. In a subsequent paper based on the study of 265 cases of cerebrospinal fever at the same hospital, Herrick¹⁰ states that about 45 per cent were recognized before meningitis developed, and about 4 per cent of the cases of meningococcus infection did not show meningitis. A widespread infection was indicated by a petechial rash, arthritic pains, and complications such as panophthalmitis, arthritis, pericarditis, endocarditis, pneumonia, pleurisy, and orchitis. The success of intravenous treatment was a further proof of meningococcus sepsis.

Examples of the non-meningitic form of cerebrospinal fever similar to those described by Netter (*vide* MEDICAL ANNUAL, 1918, p. 129) are recorded by D. H. C. Given,¹¹ who describes an outbreak of fourteen cases of *purpura* due to meningococcal infection, in three of which meningeal manifestations were wholly absent. F. Marino¹² reports two cases of cerebrospinal fever, one of which was fatal, with initial septicæmia, the meningococci being present in the blood before being demonstrable in the cerebrospinal fluid. He also reports two cases of meningitis with relapse, the relapse assuming the character of a re-infection. In each case the relapse was accompanied by a definite petechial rash, and the spinal fluid during the relapse showed meningococci on culture, after previous cultures had been repeatedly negative during the quiescent stage.

Intermittent fever of meningococcal origin is not very frequent. Netter,¹³ who saw only five examples of it among 368 cases of cerebrospinal fever, reports a case in a boy, age 15, who developed an irregular intermittent fever, with attacks which were quotidian and sometimes tertian, the paroxysms occurring sometimes in the morning and sometimes in the afternoon, and being accompanied by an eruption of erythema multiforme. Quinine was given without any effect. The erythema persisted, and was accompanied by a few petechiæ. About four weeks after the onset symptoms of meningitis developed, turbid fluid containing meningococci was obtained on lumbar puncture; four doses of antimeningococcal serum were given intrathecally, and complete recovery took place.

In a series of 120 cases of cerebrospinal fever, mainly in adolescents and adults, reported by C. Worster-Drought,¹⁴ the more serious *nervous sequelæ*

were as follows: strabismus, 2 cases; blindness in one eye (peripheral), 1 case; monoplegia of seven months' duration, 1 case; hemiplegia with almost complete recovery of motor power seven and a half months after onset, 1 case; neurasthenia, 4 cases; absolute deafness, 2 cases; partial deafness, 1 case. Of 94 military cases included in this series, 11 were discharged as permanently unfit, viz., 5 for neurasthenia, 2 for permanent deafness, and 1 each for strabismus, blindness, hemiplegia, and persistent pain in the lumbar region after exertion.

According to Hallez,¹⁵ the chief cause of the failure of serotherapy in cerebrospinal meningitis, especially in infants, is that the disease develops in an enclosed cavity. In another group the meningitis may be accompanied by hydrocephalus, or there may be ependymitis with posterior basilar meningitis or encysted meningitis at different points. Hallez has seen 24 cases of the partitioned-off type—9 in young adults, 2 in girls of 11 and 13, and 13 in infants from 2 to 24 months old. The return of symptoms after they have subsided under serotherapy, the taut and protruding fontanelle, the emaciation, and the alternate redness and pallor of the skin, eruption and profuse night sweats, and abnormal dryness of the skin, suggest that the meningitis is developing in an enclosed cavity. The infant's torpor is interrupted by moans and cries except during its feeds, indicating localization in the ventricles and excessive pressure. Hearing or vision may be impaired. Motor disturbances include a tetaniform stiffness and a variable degree of paresis, with or without tremor in repose. Convulsions are rare, but monoplegia of a spastic type has been found. If the ventricles contain pus, the temperature may rise again. Lumbar puncture may show approximately normal fluid in contrast with the aggravation of the clinical symptoms, or there may be very little fluid in the spinal canal, or it may show that the serum injected two or three days before was not absorbed. The decisive sign is the comparatively clear spinal fluid, and the purulent fluid that can be aspirated from the ventricles.

In a paper comparing the manifestations of the *serum disease* after the intrathecal and after the hypodermic method of injection, H. D. Rolleston¹⁶ says that the acute aseptic meningitis set up by injection of serum into inflamed meninges can be distinguished from a genuine relapse of cerebrospinal meningitis which could be benefited by serum, by examination of the cerebrospinal fluid for meningococci and for the normal reducing agent (glucose), which is absent in relapses of meningitis and present in the meningism due to the serum disease. The meningeal manifestations of the serum disease are peculiar to intrathecal injections of serum, and do not appear to result from larger quantities of serum given, but are probably connected with some hypersensitiveness of the meninges. The incidence of serum disease does not appear to be higher after intrathecal than after hypodermic injection. C. B. Ker,¹⁷ in an account of 60 cases of cerebrospinal fever treated with Flexner's serum, stated that of 48 cases who had lived nine days or more after injection, 36, or 76 per cent, suffered from serum disease. The outstanding feature was the rash; arthritis occurred in 6 only, and was very severe. Cervical adenitis was present in 2 cases. In 9 cases prodromal fever occurred twelve or twenty-four hours before the appearance of any other symptoms. The occurrence of the rash did not appear to be much influenced by the dosage. Ker regards attacks of serum disease of advantage rather than otherwise, many cerebrospinal patients being much improved by these reactions. The benefit is probably due to some stimulation of metabolism and the processes of repair. (*See also SERUM DISEASE.*)

DIAGNOSIS.—C. Worster-Drought¹⁴ and A. M. Kennedy¹⁸ record nine cases of pneumococcal meningitis in patients from three months to forty-one years old. Most of them had been admitted to hospital with the diagnosis of cerebro-

spinal fever, and their true nature was only revealed by the presence of pneumococci in the cerebrospinal fluid, which was turbid or definitely purulent, and in the majority of cases showed considerable increase of tension. Cytologically all the fluids showed numerous polymorphonuclears, and occasionally a few mononuclears. All the writers' cases died, but they allude to instances of recovery published by Hemenway, Broadbent, Netter, Shand, and Cannon. Two fatal cases of pneumococcal meningitis which were at first diagnosed and treated as cases of meningococcal meningitis are reported by Panayotabon¹⁹ occurring in two children of the same family in the course of a few days. No carriers were found in other members of the family examined. A fatal case of meningitis caused by the *Micrococcus flavus* alone, which has hitherto been regarded as a more or less harmless saprophyte of the nasopharynx, is described by J. H. Teacher and A. M. Kennedy.²⁰ The patient had had the cribriform plate of the ethmoid fractured, and the infection had apparently passed through the fracture in the plate to its upper surface, and thence to the meninges.

PROPHYLAXIS.—T. C. M'Walter²¹ associates cerebrospinal fever with overcrowding and moist heat such as are found in the ordinary form of temporary wooden hut adopted in most of the camps. He recommends that when a few cases have occurred in a camp the entire camp should be subjected to a system of throat-spraying and inhalation. A Levick spray can be set up in a guard-room cell or any other impermeable chamber of 400 to 600 feet capacity. From $\frac{1}{2}$ to 1 oz. of Chloramine is usually employed, and the man stays in the spray-room from ten to twenty minutes, and in a cooling-room for another twenty minutes. Under this treatment the throat swabs soon become negative, and the disease seldom spreads. On the other hand, the local treatment of carriers is by no means always successful. Reference has already been made to the experience of Redden (*vide* 'Etiology'), and similar conclusions were reached by P. Fildes and P. B. Wallis²² in their report to the Medical Research Committee on the local treatment with antiseptics of meningococcus carriers in the Navy. They found that one-third of the men recovered spontaneously, and that none of the methods of treatment tested, such as inhalation or nasopharyngeal spray of chloramine-T, or nasopharyngeal spray of acriflavine 1-500, has any conspicuous merit, nor has one any obvious advantage over another.

Cleminson⁷ recommends that antiseptic spray treatment should be preceded by a spray of Adrenalin Chloride 1-6000 in normal saline solution, the effect of which is to shrink up the mucosa and so to allow a much freer access of the spray to all parts of the nose.

TREATMENT.—In the initial or septicæmic stage Herrick endeavours to sterilize the blood-stream by massive doses of antimeningococcic serum given intravenously. The patient is first desensitized by the injection of 1 c.c. of serum subcutaneously, and one hour later 80 to 150 c.c. are given intravenously. In some cases the injection is repeated every 8 to 12 hours, and in the mild cases every 24 hours, till the symptoms are controlled. As soon as meningitis develops, lumbar puncture is performed about half an hour after the intravenous injection. Enough fluid is withdrawn to reduce pressure to approximate normal, and rarely more than 30 c.c. are given intrathecally. The average number of lumbar punctures in cases treated by this method was seven, and the average number of intrathecal injections four. The average case required a total of 400 to 600 c.c. of serum intravenously and 100 c.c. intrathecally. Herrick also gave large doses of Morphia during the first twenty-four or forty-eight hours to control violent symptoms. His results are as follows: Of 265 cases, 137 were treated by intrathecal injections alone, with a mortality of 34.3 per cent; and 128 by combined intravenous and intrathecal methods, with a mortality of 14.8 per cent. The importance of early treatment was

shown by the following figures: 105 were identified before meningitis had developed, and 17 per cent of these patients died, as compared with a mortality of 30 per cent among 160 in whom treatment was not begun until after meningitis had developed. Among 76 cases in whom the disease was not recognized until after the spinal fluid had become clouded, the mortality was 42.1 per cent.

G. McConnell, M. L. Morriss, and N. A. Seehorn,²³ who report 30 cases of meningococcic cerebrospinal meningitis, inject 40 c.c. of Serum intrathecally irrespective of the total amount of fluid removed, provided that it was more than 45 c.c. Whenever the quantity of fluid removed was less than 45 c.c., the rule of injecting an amount of serum 5 c.c. less than that of the fluid withdrawn was followed. The serum was not given more frequently than at 24-hour intervals except in fulminating forms, when as many as four injections within 38 hours were given. Many cases will need no further serum after the fourth dose; but if the patient does not improve, the injections should be continued until recovery or death ensues. In an article on the resistance of the meningococcus to intraspinal serotherapy, which they attribute to an extrameningeal localization of the organism, Bloch and Hébert²⁴ recommend the introduction of antimeningococcic serum into the general circulation in every case in which rapid improvement does not follow the first or second spinal injection. Of the various methods—intravenous, intramuscular, and subcutaneous—the intramuscular seems to them to be the best; 40 c.c. should be given at a time, and a minimum of three injections is necessary.

In a series of over 400, including a high percentage of fulminant cases, P. W. MacLagan²⁵ had a mortality of 34 to 35 per cent. Intrathecal injections of 20 to 30 c.c. daily were given until there was great improvement and until the cerebrospinal fluid was clear, or until six or seven doses had been given; 30 c.c. were also injected intramuscularly to control the general infection. In fulminating cases intramuscular injections of Adrenalin Hydrochloride 1-1000 in doses of 10 min. were given to replace the internal secretion of the damaged adrenal medulla, with promising results.

T. A. Hoch²⁶ reports a case of cerebrospinal fever in a man, age 31, successfully treated by *intraspinal and intraventricular administration* of antimeningococcic serum. Hitherto intraventricular treatment has only been performed in children or in adults *in extremis*. Hoch emphasizes the importance of starting the treatment early, before a walling-off takes place, and before the inflammatory process has done irreparable damage; 46 c.c. of antimeningococcic serum were injected in doses of 10, 11, and 25 c.c. into the left ventricle, and 52 c.c. into the right ventricle, after preliminary tapping. Apart from nerve deafness in the right ear, complete recovery took place.

The following description is given by Hallez¹⁵ of intraventricular puncture in infants for walled-off meningitis. The needle is introduced into the fontanelle about 2.5 cms. from the median line, and pointed towards the opposite auditory meatus at an angle of 20°; it is pushed in from 2 to 4 cms., thus usually piercing the second frontal convolution; 30 to 60 c.c. are generally aspirated, and 20 c.c. of the serum are then injected. The injections can be continued for several days into both ventricles. This method has generally been used as the last resort, and consequently none of Netter's eleven cases and only four of Hallez's cases recovered; but with earlier recognition of the walling-off of this meningitis, better results may be expected.

REFERENCES.—¹Med. Bull. 1918, 342; ²Lancet, 1918, i, 92; ³Jour. Inf. Dis. (abstr. Jour. Amer. Med. Assoc. 1918, ii, 405); ⁴Lancet, 1918, i, 290; ⁵Ibid. 1917, ii, 602; ⁶Ibid. 711; ⁷Brit. Med. Jour. 1918, ii, 51; ⁸Boston Med. and Surg. Jour. 1918, i, 623; ⁹Jour. Amer. Med. Assoc. 1918, i, 227; ¹⁰Ibid. 1918, ii, 612; ¹¹Jour. R.N. Med.

Service, 1918, 296; ¹²*Amer. Jour. Med. Sci.* 1918, ii, 270; ¹³*Brit. Jour. Child. Dis.* 1918, i, 1; ¹⁴*Lancet*, 1918, ii, 39; ¹⁵*Le Nourrisson* (abstr. *Jour. Amer. Med. Assoc.* 1918 i, 1040); ¹⁶*Brit. Med. Jour.* 1917, ii, 762; ¹⁷*Ibid.*; ¹⁸*Ibid.* 1917, ii, 481; ¹⁹*Brit. Jour. Child. Dis.* 1918, 18; ²⁰*Lancet*, 1918, ii, 422; ²¹*Med. Press and Circ.* 1918, i, 105; ²²*Lancet*, 1917, ii, 527; ²³*Amer. Jour. Med. Sci.* 1918, ii, 105; ²⁴*Presse Méd.* 1918, 337; ²⁵*Edin. Med. Jour.* 1918, i, 370; ²⁶*Boston Med. and Surg. Jour.* 1918, i, 327.

CHEST, SURGERY OF. (See THORAX.)

CHICKEN-POX. (See VARICELLA.)

CHOLERA.

Sir Leonard Rogers, M.D., F.R.C.P.

ETIOLOGY.—L. Nichols¹ deals with the chemical affinities of the cholera organism, and in view of the injuriousness of acids he tried experimentally to render the intestines of rabbits acid by drugs, but without success. Brilliant-green by the mouth caused inflammation of the intestine in animals. Greig² has tested the virulence of cholera and cholera-like vibrios when injected intravenously in rabbits, and found the latter 25 per cent less toxic than the former. A. Castellani³ suggests the addition of serums which agglutinate and precipitate the common intestinal organisms to fluid culture media for cholera organisms, but found the plan easier in theory than in practice.

TREATMENT.—P. McC. Lowell⁴ has carefully studied cholera in pregnant women, in whom the mortality under the Hypertonic Saline treatment was 45 per cent, against 19 per cent in non-pregnant cases, being higher the later the stage of the pregnancy. Out of 66 cases, 37 aborted, and only one child lived, while, including fatal cases in the mother, 71 per cent of the children perished. In severe cases the children die early, and toxic absorption from the dead fœtus adds to the gravity of the mother's case. The most serious cases are those with no radial pulse and absence of urine for twenty-four hours, in whom the mortality is 80 per cent. During 1916, whenever the fœtus was dead or abortion had commenced, as ascertained by frequent examinations, assistance was given to Remove the Fœtus, which was easily accomplished without an anæsthetic within fifteen minutes at the outside. The results were very good, mothers being lost in 2 out of 11 cases, or a mortality of only 18 per cent, equal to that in non-pregnant cases, thus fully justifying the method employed.

L. Rogers⁵ records further results confirming the value of Intravenous Injections of Sodium Bicarbonate in the prevention of post-choleraic uræmia. (See MEDICAL ANNUAL, 1916.) In the three years, 1912–14, the mortality from uræmia in his wards among 592 cases without alkalies was 11·2 per cent, while from 1912–17 with alkalies it was only 3·25 per cent in 584 cases, a reduction of 70 per cent in the loss from this common and serious complication. In the first half of 1917 his total mortality was only 15·6 per cent. (During the whole year it was only 15 per cent, or one-fourth of the former mortality before the introduction of the hypertonic saline treatment.)

J. A. Shorten⁶ records further research on post-choleraic uræmia, and describes a new method of estimating the phosphates in the blood. He also found in the blood of cholera cases an increase in the urea, non-proteid nitrogen, and a phosphatic retention, and suggests the administration of Calcium Salts by the Mouth, and raising the proportion of Calcium Chloride in the saline Intravenously, to combat the last-mentioned change.

Adrenalin is said to be useful by Naame (*p.* 1).

REFERENCES.—¹*Lancet*, 1917, ii, 563; ²*Ind. Jour. Med. Research*, 1917, Oct., 340; ³*Brit. Med. Jour.* 1917, ii, 476; ⁴*Philippine Jour. Sci.* (B), 1917, July, 191; ⁵*Lancet*, 1917, ii, 745; ⁶*Ind. Jour. Med. Research*, 1918, April, 570.

CHOREA.*Frederick Langmead, M.D., F.R.C.P.*

TREATMENT.—About three years ago A. L. Goodman suggested the use of **Autoserum** in the treatment of chorea. R. D. Moffett, in a recent paper, gives an account of this method. It consists in taking the blood from the arm of a patient suffering from chorea, separating the serum and injecting it into the spinal canal of the same child after withdrawing 15 to 20 c.c. of the spinal fluid. About 100 cases had been so treated, with very remarkable results in some cases. An earlier form of treatment had consisted in merely withdrawing the cerebrospinal fluid, but this had produced no definite improvement. Before the autoserum is used, the patient should be kept in bed without medicine of any kind for four or five days. Another important precaution is to ascertain whether the child has tuberculosis or syphilis, as such cases do not react favourably. The same is true of children with enlargement of the thyroid gland.

Method.—Fifty c.c. of blood are withdrawn from one of the veins in the arm and rapidly centrifugalized. The serum is then pipetted into a sterilized vessel, placed in the incubator, and kept at body temperature. A lumbar puncture is performed and 20 c.c. of fluid are allowed to run off. The blood serum at the body temperature is then slowly injected. This usually takes about five to eight minutes, and afterwards the patient is kept in a recumbent position in bed for an hour or two, for if allowed to sit up immediately heart failure may follow. If the effect is likely to be beneficial, improvement should be noted in two or three days; in the very severe cases the muscular twitching and movements become less, and the children take their meals better. A second injection is given five or six days later. These are a few symptoms which should be watched for after this treatment: a slight rise in temperature, vomiting, an increase in the pulse-rate, and occasionally a slight stiffness in the neck. These all disappear within a few hours. Another symptom noted is a slight frontal headache.

Of the cases treated, 5 per cent have had a recurrence within a year. This is lower than after the usual forms of treatment. Moffett believes that autoserum should be used in all cases, and especially those that have resisted other treatment. The course of the illness can be much shortened and the general improvement is more rapid. If any benefit accrues, the child should be practically well in three weeks.

E. M. Tarr² has employed the same treatment in 14 cases. Of these, 11 were counted as cures, 2 improved, and 1 failed to benefit. The greatest number of injections given to any patient was three. The amount of serum per dose ranged from 7 to 18 c.c. The youngest child received 16 c.c. and the eldest the same dose, for no rule can be made at present as to the exact dosage. After the injection the patient should be placed in a quiet room (alone if possible), no solid food allowed for twelve to twenty-four hours, and no visitors for forty-eight hours. In Tarr's opinion the strongest argument for the treatment is that acute cases can be cured before cardiac conditions develop.

REFERENCES.—¹*Med. Rec.* 1917, ii, 414; ²*North-west Med.* 1917, xvi, 308 (in *Amer. Jour. of Obsts.* 1918, May, 880).

CLUB-FOOT. (See FOOT, DEFORMITIES OF.)

COLITIS IN INFANTS. (See ILEO-COLITIS.)

COLITIS, MUCOUS.*Robert Hutchison, M.D., F.R.C.P.*

Broadway¹ describes two cases of 'mucous colitis' treated successfully by means of **Charcoal**. (As both his patients had diarrhoea with the passage of mucus and blood, they might perhaps be better described as cases of ulcerative

colitis.) Charcoal was given in one case in 2-dr. doses in water four times daily after meals, with the addition of 2 dr. of sherry to make it palatable. In the other case it was given in cachets. In both cases the stools became normal after a few weeks, and remained so at the end of several months. The author thinks that the charcoal acts partly as an antiseptic and partly as an astringent. Before trying charcoal he had found Horse Serum most useful, and then Bismuth Salicylate.

REFERENCE.—¹*Lancet*, 1918, i, 637.

COLLOID MILIUM.

E. Graham Little, M.D., F.R.C.P.

This is a very rare disease, the diagnosis of which can only be decisively made by histological demonstration. Ketron¹ reports a new case, with very complete histological investigation. The disease occurred in a man, age 42,

EXPLANATION OF PLATE XII.

1.—An old case of slow trachoma. This shows the proper method of using a glove-buttoner as an eye-turner in everting the upper lid and of exposing the cul-de-sac. It is noted that about half of the cul-de-sac is shown in this picture.

2.—A normal eyelid. Note the lower fifth, which is the cul-de-sac. The conjunctiva in this region is thin and bluish-pink, and the blood-vessels stand out prominently like cords. The conjunctiva in the upper four-fifths, covering the tarsal plate, is thicker, yellowish-red, and supplied with blood-vessels which run vertically upward across the plate from the anastomotic arches formed from the transverse branches of the arteries of the cul-de-sac. The three small, whitish spots on the nasalside are areas of calcareous degeneration, and should not be mistaken for follicles.

3.—Upper lid of right eye. This illustration shows the appearance of a case of slow trachoma before proper pressure has been made with the eye-turner. The lid is roughened, and the adventitious blood-vessels can be noticed running across the outer third of the tarsal plate. It is impossible, however, to make out any scar tissue when the lid is manipulated in this fashion. This should be contrasted with the same lid after the proper pressure has been applied, as shown in *Fig. 4*.

4.—This is the same lid shown in *Fig. 3*, but the glove-buttoner has been manipulated so as to make the lid more or less anæmic and bring out the scar tissue. Note the areas of papillary granulations surrounded by the bands of white scar tissue. This method of using the turner to make the lid anæmic requires practice, but is of extreme importance in detecting scar tissue in its early stages.

5.—Upper lid of right eye. A typical case of slow trachoma of several years' standing. The islands of papillary granulations separated by vertical narrow lines of scar tissue are well marked. There are five large gelatinous follicles at the lower border of the tarsal plate. Note that the cul-de-sac has been replaced almost entirely by scar tissue. The normal vertical vessels in the cul-de-sac have disappeared, and a few adventitious vessels running in an oblique direction can be seen in the nasal side of the cul-de-sac. There still remains some normal conjunctiva in the upper part of the lid.

6.—Upper lid of left eye. An old case of slow trachoma. Cicatrization is well marked. There remain, however, a few areas of papillary granulations near the centre of the lid. The cul-de-sac is completely filled up with a mass of poorly-defined gelatinous granulations representing a typical case of Stellwag's brawny oedema. The disease has existed for about six years.

in good general health, and had begun on the left hand twelve years previously as a group of wart-like tumours with no subjective sensations. The eruption spread to the right hand and the helix of the left ear. The histological demonstration provided the diagnosis. Colloid masses were found in the papillary layer of the cutis, constituting the bulk of the tumour. Treatment is not dealt with in the paper.

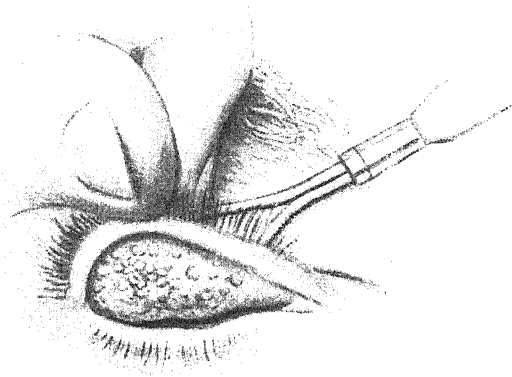
REFERENCE.—¹*Johns Hop. Hosp. Bull.* 1918, July, 163.

CONJUNCTIVA, DISEASES OF.

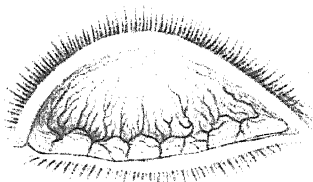
R. Foster Moore, F.R.C.S.

Trachoma.—Foster¹ considers this condition under two clinical heads: (1) Fulminating trachoma; (2) Slow trachoma. He gives a full description of the clinical signs, course, and complications of these, with much detailed accuracy, and twelve good enlarged figures showing the different stages

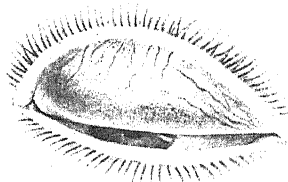
PLATE XII.
TRACHOMA (FOSTER)



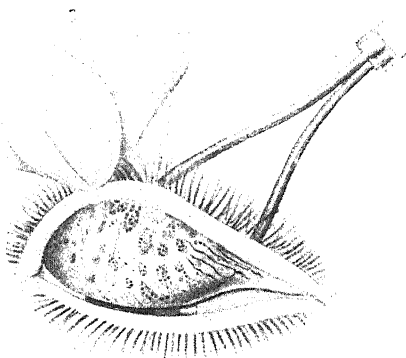
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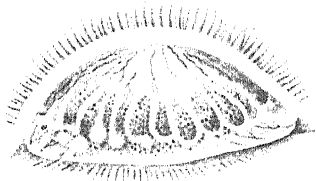
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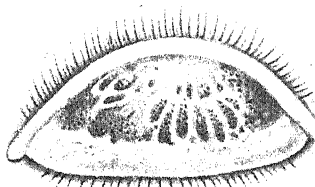
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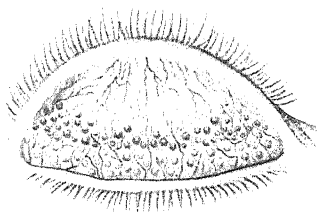


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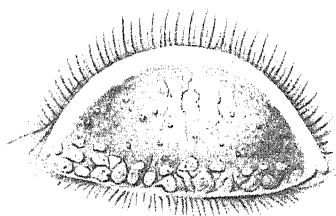


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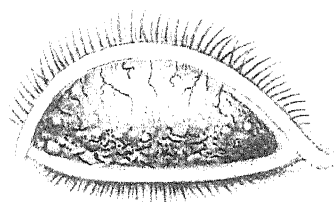
PLATE XIII.
TRACHOMA—continued



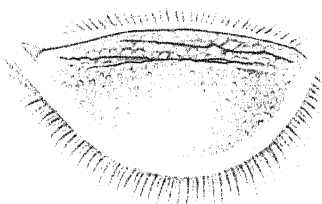
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included, which have been redrawn here on a smaller scale from the excellent figures in the *Journal of the American Medical Association*. The transmissibility of the disease from one person to another is undeniable, and especially is this so in the fulminating variety. The author, working with Surgeon C. H. Lavinder, made numerous attempts to inoculate Rhesus monkeys and baboons with the disease, but without success. The papillary hypertrophy seen in the disease is not pathognomonic of trachoma; it is seen in any case of continued irritation of the conjunctiva. The follicular

EXPLANATION OF PLATE XIII.

7.—Follicular conjunctivitis, upper lid of right eye. The cul-de-sac and the lower portion of the tarsal plate are studded with a large number of follicles. These follicles are fairly uniform in size, almost perfect hemispheres, and they appear to spring from the surface of the conjunctiva and are not buried in that structure. This form of follicular conjunctivitis is not so common as that shown in *Fig. 8*. The diagnosis from trachoma in cases of this type is made by the fact that the conjunctiva is not thickened, that the normal blood-supply is maintained, the vessels of which can plainly be seen running vertically upward in the cul-de-sac; also by the size, appearance, and superficial position of the follicles. It should be observed that there is no thickening in the conjunctiva of the cul-de-sac, that structure being normal in the spaces between the granulations.

8.—Typical case of follicular conjunctivitis, upper lid of left eye. In this patient the cul-de-sac is filled up with a number of irregularly shaped, light coloured follicles. The conjunctiva over the tarsal plate is somewhat roughened and thickened, and contains a few scattered small lymphoid follicles. Here there is a hypertrophy of the lymphoid elements of the conjunctiva, with chronic conjunctivitis. The diagnosis between cases of this type and trachoma is sometimes extremely difficult. Lids of this description are very frequently found in school-children, and often cause the examiner much embarrassment in making a diagnosis. Careful observation will show, however, that the normal blood-vessels can still be seen here and there in the cul-de-sac; also, that there are areas of more or less normal conjunctiva between the large follicles in that region. In such cases no scar tissue can be detected; neither is there any true trachoma pannus. The examination of the throat and nose in these patients will almost always show that there is hypertrophy of the adenoid tissue in these localities, such as enlarged tonsils or adenoids.

9.—Recent case of slow trachoma, upper lid of right eye. The lower part of the cul-de-sac of this eye is completely converted into scar tissue. On the lower part of the tarsal plate there is an area of poorly defined, deep-red, partially buried granulations. Higher up still are a number of deeply buried small white granulations. A careful examination with the eye-turner showed beginning scar tissue between the granulations over the tarsal plate. The deep buried white granulations are strongly significant of trachoma. Note the thickening of the cul-de-sac and the absence of any visible blood-vessels in that locality. This case should be studied in conjunction with *Fig. 8*. The diagnosis of trachoma is made on the scar tissue and deeply buried white granulations, and the absence of the normal blood-supply. There was also marked pannus in this case.

10.—Slow trachoma of some months' standing, upper lid of right eye. The cul-de-sac here is filled with a mass of poorly defined, semi-gelatinous granulations of a pinkish-salmon colour. Deep cracks can be seen between the granulations, which are arranged more or less roughly in rows. The conjunctiva of the tarsal plate is much thickened, very rough, and shows numerous small granulations which can be best detected at the nasal and temporal extremities. No blood-vessels are visible anywhere in the eye. No scar tissue could be detected by the most careful search. It is difficult to make a positive diagnosis of trachoma in eyes of this type at the first examination, although the appearance is strongly suggestive of that disease. Patients presenting this appearance should be given treatment for several weeks before a definite and positive opinion is given as to the nature of the disease.

11.—Fulminating trachoma of several months' standing. The upper lid is everted and fastened in position on the rubber eye-plate by means of two sutures. The patient is under ether preparatory to the grattage operation. A good part of the cul-de-sac can be seen, especially in the nasal half of the eye. Note the numerous granulations, which have been described as having a characteristic appearance something similar to broken granite.

granulations are described as of three types: (1) Red follicles; (2) Yellow gelatinous follicles; (3) Buried white follicles. The virus of the disease invades the deeper structure of the lid, including the tarsal plate. The author agrees with Mayou's assertion that the granules found in trachoma are follicular formations which are not primarily or necessarily infected with trachoma. The formation of fibrous tissue is an essential part of the disease; it is not comparable with the scar tissue which results from the healing of an ulcer. Pannus is a trachomatous infection of the cornea.

With regard to the fulminating type of the disease Foster's most important points are : (1) It is a rare disease ; (2) It is readily transmitted from one person to another ; (3) The period of incubation is about eight days ; (4) It has to be diagnosed from severe phlyctenular conjunctivitis and from acute infections such as those due to the gonococcus and Morax-Axenfeld's bacillus ; (5) Scar tissue has been demonstrated by the author within six weeks, but this is unusually early.

Complications of the disease are considered, and the differential diagnosis from follicular conjunctivitis and vernal catarrh. The arrangement of the blood-vessels is insisted upon, and the author states that "if any vessels are observed running in a vertical or approximately vertical direction across the cul-de-sac, it is safe to exclude trachoma."

With regard to the question as to when trachoma may be considered cured, the author states : "A case can never be said to be certainly cured until all

the conjunctiva of the upper lids has become completely replaced by smooth, white, avascular fibrous scar tissue, and the lower lids are free from any evidence of the disease."

Treatment of Vernal Conjunctivitis with Radium.—Pusey² describes his method of treating spring catarrh by means of Radium, and concludes that, whilst the number of cases treated is not sufficient to warrant any dogmatic statement, the results have been successful to a noteworthy degree. He first everts the lid and holds it in position by means of the lid forceps (Fig. 46) ; he then uses a flat radium applicator containing in varnish 5 mgrms. of radium element ; this is passed backward and forward over the everted lid just short of the point of contact with the surface. The treatment is carried on for six successive days, for a period of five minutes each day.

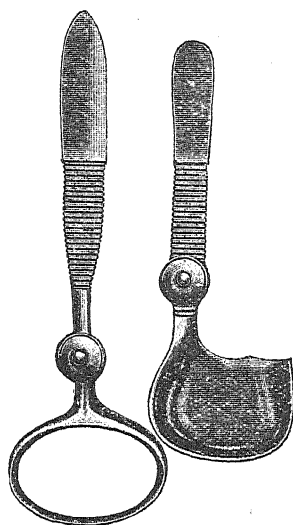


Fig. 46.—Lid forceps. The blade next the eye is of solid metal to prevent the rays reaching the eye itself—the outer blade is a ring only.

Differential Diagnosis and Treatment of Follicular Conjunctivitis.—Carhart³ speaks from experience gained at the Children's Clinics of the Bureau of Child Hygiene, New York. The distinctive points concerned in the diagnosis are the following : (1) The absence of muco-pus and of all inflammatory reaction ;

(2) The absence of pannus or involvement of the cornea ; (3) Complete absence of cicatrization of the cornea ; (4) Absence of the involvement of the deeper structures ; (5) No change in the blood-vessels. The disease should be carefully treated, because it renders the child more vulnerable to trachoma should the risk of infection occur. By way of local treatment Carhart makes special mention of a 5 per cent Citrate of Copper Ointment, and of Massage combined with Ophthalmol solution.

Parinaud's Conjunctivitis.—Morax⁴ states that there is no relation between Parinaud's conjunctivitis and tuberculous disease of the conjunctiva, though the differentiation by clinical features alone is often a delicate procedure. The author, working with Sanz and Chaillous, has shown that if a guinea-pig be inoculated with a portion of conjunctiva or infected lymphatic gland from a case of Parinaud's conjunctivitis, a negative result is obtained, and that

histological examination of the conjunctiva never reveals the presence of giant cells. In tuberculous conjunctivitis giant cells are always present. The conclusion arrived at is that "the diagnosis of Parinaud's conjunctivitis should be reserved for those cases where the absence of giant cells and the negative result of inoculation and culture would justify the elimination of tuberculosis, sporotrichosis, etc., of the conjunctiva."

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1917, ii, 1837; ²*Ibid.* 1918, ii, 806; ³*Med. Rec.* 1918, i, 540; ⁴*Brit. Jour. Ophth.* 1918, March, 133.

CONSTIPATION. Action of Yeast discussed (p. 8).

CORNEA, DISEASES OF.

R. Foster Moore, F.R.C.S.

Eczematous Kerato-conjunctivitis.—Cridland¹ describes four types of this disease: (1) Eczematous infiltration; (2) Round eczematous ulcer of the cornea; (3) Fascicular keratitis; (4) Eczematous pannus. The clinical appearance and course of these is fully given. The author states that eczema of other parts is frequently associated with these conditions. He speaks of two types of diathesis with which this disease is associated, the torpid and the erethistic, and speaks of other ailments to which these children are prone. With regard to incidence, the disease is distinctly more common in towns and cities where coal is found immediately below the surface than in those otherwise situated. Amongst 8575 children, there were 59 with definite tuberculous disease, and yet not one of these tuberculous children was found in the group of eye-disease cases.

After reviewing the views of many surgeons as to etiology, the author expresses his own views by saying, "According to the evidence we have at present, the phlycten is the ocular manifestation of a toxæmia, which in many cases is undoubtedly tuberculous, but in a number—probably mild ones only—is of gastro-intestinal origin, the exact nature of which is unknown."

With regard to treatment, Cridland thinks that **Atropine** is only necessary if deep ulcers or hypopyon are present. **Subconjunctival Injections** may be useful, as also 3 per cent **Dionin** drops. General treatment is perhaps more important than the local. He considers **Tuberculin** indicated in severe cases, and that errors of refraction should be corrected.

Phlyctenular Disease and its Relation to Tuberculosis.—Hird,² dealing with this subject, is chiefly concerned with strengthening the "growing opinion that there is a relationship between phlyctenular disease and tuberculosis."

The Use of Tuberculin in Eye Diseases.—Verheyden³ writes of the treatment by **Tuberculin** of the following diseases, which are stated to have been tuberculous in origin: keratitis strumosa, kerato-conjunctivitis, miliary keratitis, tuberculous iritis, irido-cyclitis, episcleritis, scleritis, central tuberculous choroiditis, and tuberculous paralysis of the third nerve. Old tuberculin prepared by Messrs. Burroughs and Wellcome was used.

Transplantation of Mucous Membrane of Mouth for Various Diseases and Burns of the Cornea.—Denig⁴ has treated 150 cases of pannus due to trachoma by excising a portion of the adjoining trachomatous conjunctiva and grafting a portion of mucous membrane obtained from the mouth on to the denuded area of the sclerotic. He states that such a graft induces a hyperæmic influence, and it is largely owing to this fact that benefit accrues. He afterwards used the method for scrofulous pannus, torpid processes of the cornea, neuroparalytic conditions, herpes, and burns of the cornea and conjunctiva. He states that a thin flap is absorbed in one or two years, whereas a thick flap may last as long as five or six years.

Keratitis Pustuliformis Profunda.—Ernst Fuchs⁵ describes a rare form of keratitis characterized by the presence of yellow spots resembling pustules on the deepest layers of the cornea, accompanied by severe iritis and hypopyon. The clinical picture is as follows. In the cornea are a number of spots which are yellow in colour and deeply situated. Around these spots there is usually a fine grey halo, which passes into a diffuse opacity of the whole cornea, and which is composed of fine grey dots, often accompanied by fine grey lines. Severe iritis and hypopyon are always present; the hypopyon often fills the anterior chamber. *Keratitis punctata* is frequent. The course of the disease is chronic. Ulceration of the cornea never occurs, but the formation of an anterior synechia is rather common. It is a disease of elderly people, and is much more frequent in males. The chief conditions from which it has to be differentiated are *keratitis profunda*, *sclerosing keratitis*, *interstitial keratitis*, and *disciform keratitis*. The author examined four cases microscopically. In every instance it was the deepest layers of the cornea which were chiefly affected. The hypopyon was mainly composed of polymorphonuclear cells, and was sterile. Inflammatory changes were limited to the iris and cornea. In two cases the anterior chamber was absent, the iris being adherent to the cornea, although there was no evidence of perforation. The cause of the disease is unknown. It is not traumatic in origin.

Corneal Tattooing.—Verhoeff⁶ describes the following method, for which he claims advantages over ordinary tattooing: A stick of Indian ink is rubbed up with normal saline solution. This is sucked up into a hypodermic syringe, and then the whole is sterilized by boiling. The needle is now passed into the edge of the leukoma and on into its centre. The fluid is then injected until a small margin of the nebula all round remains.

Conical Cornea.—Wicner⁷ describes a new operation for this condition. It consists in dissecting away an elliptical portion of the peripheral part of the cornea, going as deep as Descemet's membrane. The cut edges of the cornea are then sewn together, a narrow gold strip 1 mm. wide and 0.005 mm. in thickness being placed close to the cut margin on either side. These strips are perforated, and the stitches are passed through the holes, the idea being to prevent them from cutting through the corneal tissues.

Jackson,⁸ in a paper on "Conical Cornea or Anterior Myopia," indicates by the title the relation between the distention of the anterior and posterior segments of the eyeball. He believes conditions of lowered nutrition to be of first importance in the production of conical cornea. The effect of 'nipping' the lids in an endeavour to get better vision is to lessen the curvature in the direction of the palpebral fissure and to increase the curvature at right angles to this direction. The part of the cornea affected is always its central portion, i.e., the part furthest removed from the vascular limbus. There is thinning as well as softening of the tissues of the cornea. The highest degree of protrusion of the cornea that the author has seen is 2 mm. It is rare for the whole of the cornea to be involved. The apex of the cone is most commonly situated below and to the nasal side of the centre of the cornea, often being as much as 2 or 3 mm. from this point. Astigmatism is always present; a table showing its amount in 79 keratoconic eyes is given.

REFERENCES.—¹*Brit. Jour. Ophth.* 1918, April, 193; ²*Ibid.* 215; ³*Ibid.* 223; ⁴*N. Y. Med. Jour.* 1918, i, 1074; ⁵*Arch. f. Ophth.* 1915, xc (abstr. *Brit. Jour. Ophth.* 1918, April, 244); ⁶*Jour. Amer. Med. Assoc.* 1917, ii, 1420; ⁷*Ibid.* 797; ⁸*Ibid.* 793.

CORONARY THROMBOSIS. (See ANGINA PECTORIS.)

CRANIAL SURGERY. (See HEAD, SURGERY OF.)

CRANIOTABES.*Frederick Langmead, M.D., F.R.C.P.*

E. Hughes¹ has undertaken an inquiry into this subject, and bases his conclusions on a study of 94 cases, reinforced and controlled by other material.

ETIOLOGY.—Friedleben found an average diminution of about 3 per cent in the calcium content of the posterior parts of the skull in infants during the second three months of life. This, Hughes points out, accords with the fact that the total duration of mechanical pressure on these parts has been greater at some stage of the second three months than before; and with the time-

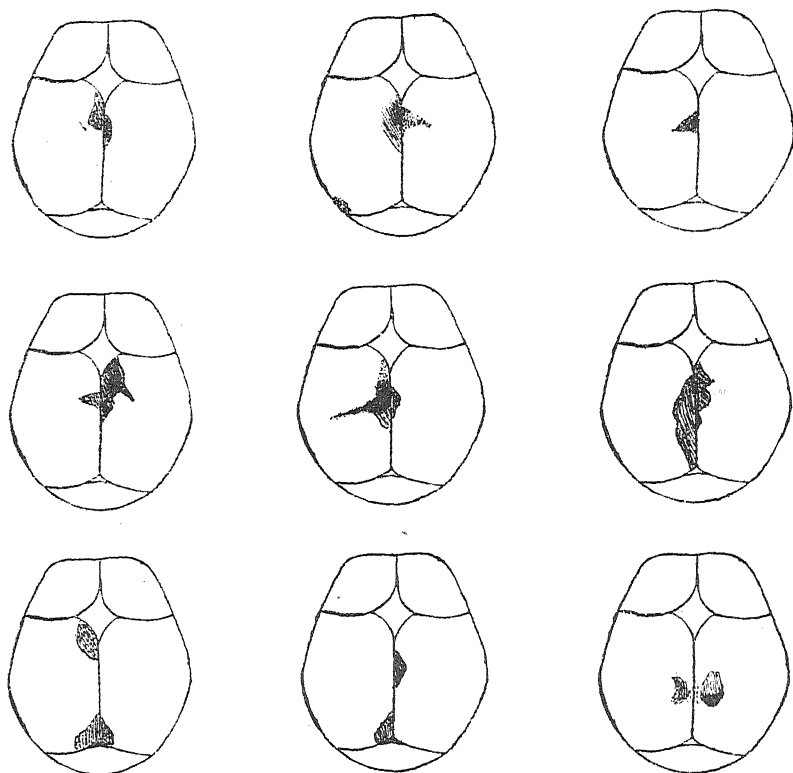


Fig. 47.—*Fetal Craniotabes.* The situations shown in Figs. 47 and 48 are approximate, not to scale, and transcribed from graphic records carefully made at the time of observation. The amount of shading expresses relative degrees of loss of elasticity.

incidence of the maximum softening in craniotabes. But if the available pressure were a sufficient cause in itself, there would be little to prevent nearly all infants from acquiring craniotabes, whereas there are immense differences in their liability to it. There must therefore be an additional cause. He mentions those usually put forward, but makes no distinction, such as others have made, between central craniotabes or that in the centre of the bone (called by some 'true craniotabes'), and peripheral craniotabes at the bone margins in the neighbourhood of sutures and fontanelles ('false craniotabes'), holding that no such distinction is tenable. This leaves four chief theories

to be dealt with : that it is due to (1) rickets, (2) syphilis, (3) rickets combined with syphilis, (4) to neither, but to some cause at present unrealized. The last view rests on the fact that neither syphilis nor rickets can be demonstrated in every case, and further, that both are so common as to be able to be regarded as adventitious. In opposition to this he suspects that the absence of rickets

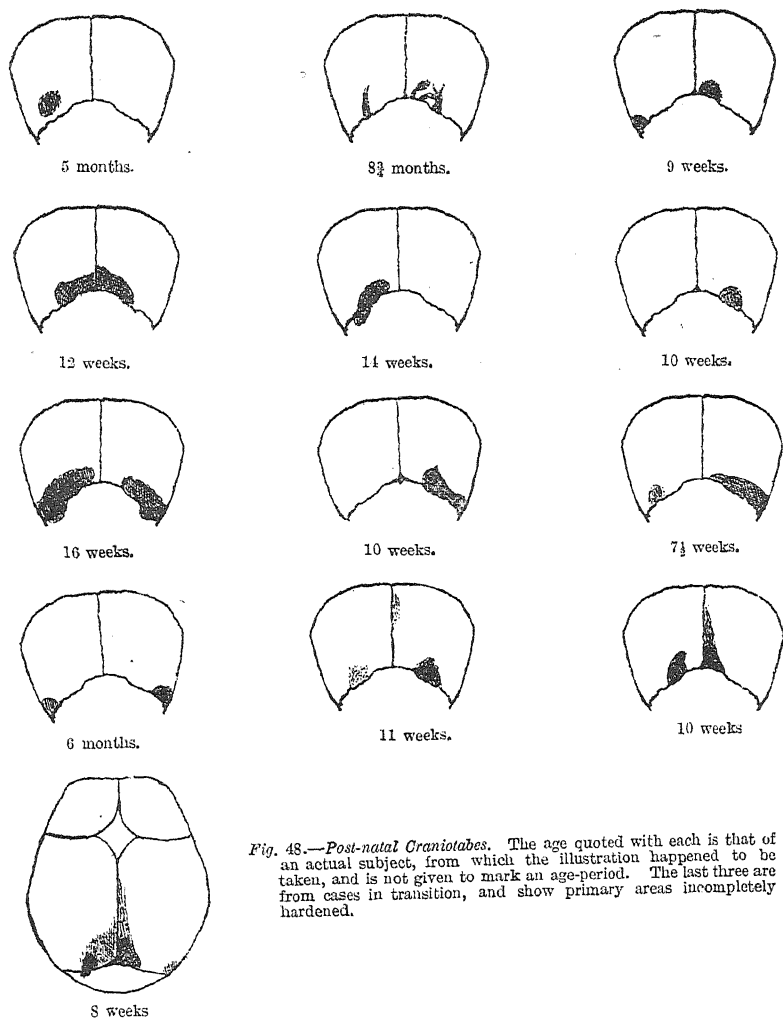


Fig. 48.—*Post-natal Craniotabes*. The age quoted with each is that of an actual subject, from which the illustration happened to be taken, and is not given to mark an age-period. The last three are from cases in transition, and show primary areas incompletely hardened.

is apt to be affirmed loosely, as cases have to be followed up for some time. Of 37 cases in which observation was satisfactory, there was obvious rickets in 35, in most of them moderately severe. There was also a significant ratio between the amount of craniotabes and the subsequent rickets. Of the two negatives, in the case of one the craniotabes was trivial; in that of the other,

two older children of the same family had been under observation with rickets of some severity.

Regarding causation by syphilis, of the 94 observed, 40 were certainly syphilitic, 21 more were probables. In the remaining 33, evidence was either vague or absent. Only 13 showed a severe infection. There was no relationship between the severity of the two conditions, or between their degrees of activity, nor any coincidence in their diminution when the syphilis was treated. He asserts the absence of syphilis in certain whole families furnishing cranio-tabetics, and on all these grounds rules out syphilis as the actual cause. He supposes that syphilis acts by favouring the existence of the true cause, which he assumes to be rickets. Probably the effect of intracranial tension is negligible, as in many cases it could not be shown to be increased.

PHYSICAL CHARACTERS.—Among the population on which his observations were made, probably no inconsiderable number of infants born at or near

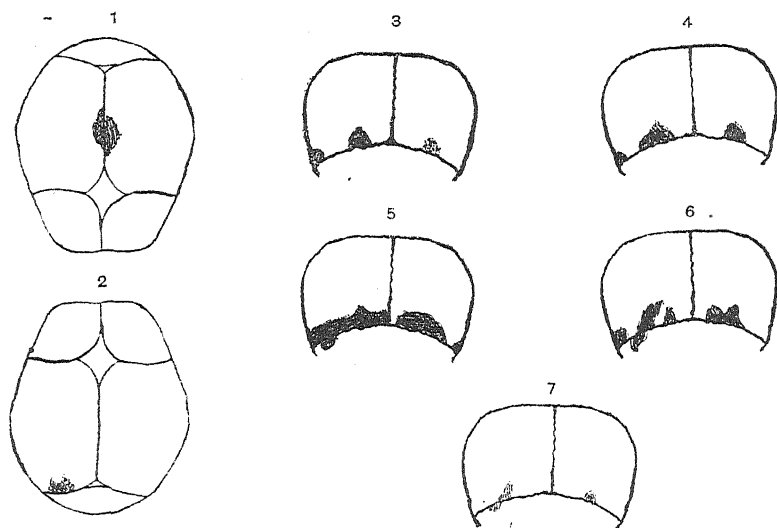


Fig. 49.—Schematic representation of successive phases. Figures 47–49 are kindly lent by *The Lancet*.

term show craniotabes at birth. Thus in 153 consecutive births there was craniotabes in 30 of the infants, or 1 in 5. This condition, called by him 'fœtal' or 'primary' craniotabes, has the following characteristics: (1) It is asymmetrical and elicited by slight to moderate pressure; (2) It is found only in vertex presentations; (3) It occurs nearly always in close relation to the sagittal suture; (4) It is habitually followed, after a varying time, by craniotabes of the type recognized and described as such. After birth the fœtal area hardens or undergoes modification, according to its site. In many instances the patches, which often commence about 2 cms. behind the anterior fontanelle, lie between this and the region of the sagittal or parietal foramen, and so are no longer subject to pressure. The shortest time noted for the area to be indistinguishable from the surrounding bone was fifteen days; the commonest time was from four to five weeks. Some last longer and may still be detected at the twelfth week. The hardening proceeds progressively and

evenly—never in irregular patches. In *Fig. 47* are depicted representative sites for foetal craniotabes taken from an observed case.

The *post-natal* or *secondary* area may become evident towards the end of the first month of extra-uterine life. Thus areas of both forms—primary and secondary—are not uncommonly present on the same skull during the second month. The more advanced or extensive the foetal areas, the earlier and more widespread the formation of post-natal areas; and the milder the former condition, the slower and less complete the formation of the latter. Deviations from these rules occur, but are exceptional. Craniotabes, according to its site, may be expected to be followed, or to have been preceded, by craniotabes in other situations. Thirteen common situations are shown in *Fig. 48*, whilst *Fig. 49* shows in schematic form the characteristic complete series of events in chronological order. The development of the post-natal area from inception at (2) to maximum at (5) occupies not more than ten weeks, the maximum falling within the fourth month of infancy. After this stage re-ossification begins, and may occupy from 2 to 10 months. Large areas of nearly uniform consistence of a moderate degree of softness are probably healing quickly. In the slower form, healing takes place by irregular intrusions of bone, and occurs in those of feeble physique.

Parallel observations on slightly over 100 controls lead him to infer that infants (vertex presentation) born without craniotabes seldom show it post-natally. It is likely that a trivial foetal area may occasionally not be followed by a post-natal area, but this is unusual, and re-observation of the infant between the tenth and fourteenth week will usually disclose a new area in one or other parietal bone, of feeble development and transient duration.

Areas of softening observed at birth are clinically, and doubtlessly pathologically, identical with craniotabes of the recognized type, the points of agreement being: (1) Identity in the physical characteristics; (2) Association with and dependence upon external pressure on the areas affected, in both forms; (3) Habitual occurrence of both forms in the same individual.

REFERENCE.—¹*Lancet*, 1918, ii, 38.

CRAW CRAW.

E. Graham Little, M.D., F.R.C.P.

This is a native African term which seems to include a number of different diseases of the skin with the common factor of pruritus. Castellani has attempted to restrict the term to a somewhat ill-defined group of such diseases, met with in Africa, Ceylon, and other tropical countries, the chief characteristic on which he insists being the presence of hard horny papules, chiefly affecting the arms and legs, but sometimes spreading over the whole body except the face and scalp. The proximal lymphatic glands may be enlarged, and the disease may persist for months and even years. Pijper,¹ accepting Castellani's description and restriction of the term, claims to have isolated a diphtheria-like organism from the nodules of a case, but the account is not very convincing, as the organism grew as a terminal product in only one of several tubes inoculated with the tissue, it was not found in sections of the skin, and although subcutaneous and intravenous inoculations of the culture into rabbits produced a nodular eruption clinically like the human rash, the organism does not seem to have been recovered from the growths thus experimentally produced.

REFERENCE.—¹*Jour. Trop. Med. and Hyg.* 1917, 242.

DEAFNESS. (*See also* AVIATION, EAR IN; HEARING, A NEW THEORY OF; LABYRINTH; OTITIS MEDIA.) *John S. Fraser, M.B., F.R.C.S.*

Mumps Deafness.—It is well known that deafness occasionally occurs as a sequela of mumps. Hitherto the route of infection has not been known, but the analogy of deafness resulting from epidemic cerebrospinal meningitis

seems to be a very close one. In the latter disease it is now held that the infecting organism has its habitat in the nasopharynx, from which it gains entrance to the blood-stream, thus producing septicæmia of short duration. The meningococcus circulating in the blood finds a suitable nidus in the sub-arachnoid lymph-space, and gives rise to meningitis which, in some cases, spreads along the eighth nerve or the cochlear aqueduct to the labyrinth and produces meningococcal labyrinthitis and consequent deafness. It seems very likely that the organism of mumps gives rise to deafness in exactly the same way. Further, it has been shown that meningitis is of common occurrence in the secondary (blood infection) stage of syphilis, and that deafness and vertigo (syphilitic labyrinthitis) are not infrequent results of such meningitis. (See MEDICAL ANNUAL, 1917, p. 181.)

In examining 635 soldiers suffering from mumps, De Massary, Tockman, and Luce¹ found a lymphocytic meningeal reaction in 56 cases, and of these 16 developed meningeal symptoms. In addition to the lymphocytosis the cerebrospinal fluid in mumps generally showed an excess of albumin, very frequently a reduction in chlorides, and almost always an increase in sugar.

George H. Willcutt² states that of 34 cases of deafness following mumps the affection was bilateral in 17. In many there was tinnitus and vertigo, the latter lasting from a few hours to some days. Four patients suffered from vomiting. The deafness usually comes on about the fourth or fifth day, sometimes as late as the tenth or fifteenth.

Education of the Deaf.—The 'oral versus the finger-spelling' question is still very much with us. The opposing factors are 'pure oralism' (lip or speech reading), 'manual and sign methods,' and the 'combined system.' Goldstein³ condemns the last as a personal injustice to pupil, teacher, and institution. To him the 'combined system' represents a compromise that is a practical impossibility if the efficiency of either system is its goal. Many superintendents and teachers have never investigated with an unbiassed mind the tremendous possibilities of exclusive oral training. [Some teachers who have been accustomed to educate their pupils by the finger-spelling method are unwilling to to give it up and put themselves to the trouble of learning the newer and better way.—J. S. F.]

Lip-reading.—Morgenstern⁴ states that only two people out of a hundred who grow deaf or hard of hearing after school age take up the study of lip-reading. Many ear specialists advise it, but the advice is not emphatic enough. The average adult who has partially or wholly lost his hearing becomes morbid and indifferent to what is going on around him. The lip-reading person, on the other hand, faces the world with an entirely different attitude. The most important step is to make the student concentrate, think, and listen. Many of the deaf find this irksome at first. *The partially deaf adult should begin the study of lip-reading before his defect in hearing has become noticeable.* The relief that the eyes give to the weakened ears which suffer under the constant strain of listening, is obvious. Usually from *three to six months, in exceptional cases a year*, are required to develop skill. Morgenstern herself has travelled for three months alone in Europe, understanding several languages of the continent by sight, and enjoying the experience. The adult deaf are now organizing in many of the larger cities of the United States in order to assist one another, to provide social life, and to offer opportunities for studying lip-reading.

According to J. D. Wright,⁵ education of the American public has been so successful that the question of improving speech-teaching conditions by segregating the orally taught from those with whom finger spelling and the sign language are used is now discussed in every state of the Union. We want now

to plead for greater attention to the training of the pupils to use, for the comprehension of language, the powers of sound perception which they possess. One-third of the pupils possess sufficient power of perceiving sounds that lie within the range of the speaking voice to enable them to learn to comprehend language through the ear. These children are, however, too deaf to hear speech at ordinary conversational distances. A child who cannot hear a word spoken a yard from his ear may be able to hear if that word is spoken an inch from his ear, since his ear will then be affected 1296 times as powerfully. A child who is so deaf as to require words to be shouted an inch from his ear will never *spontaneously* learn to understand language or to speak, but he can be taught to do both. Deaf children, who yet have some power of sound perception, never get a chance to develop the association of ideas with sounds, because they do not hear well enough. Their actual physical deafness is increased by what we might call a 'psychological deafness.' This means of access through his ears is the line of least resistance—the line of inherited tendencies. When it is not open to us we must use the untrodden and unfamiliar road of the eye in comprehending spoken language. Superintendents and teachers of the deaf must be made to believe it can be done and that it is desirable to do it.

War Deafness and the Oral Method.—As a result of the War, numerous cases of deafness are occurring among French soldiers. For the treatment of these, 'centres of auditory re-education' have been established. At these clinics the treatment consists in re-education by the oral method of Itard. De Parrel⁶ states that the principle of all sensory re-education is the functional awakening of a sense by its specific physiological excitant. For the hearing it is stimulation by sound, and in particular the human voice. The instrumental method is the perfecting and putting in practice of the oral method. It strives to supplement the human voice, which is easily fatigued, limited in extent, and incapable of exact graduation in the intensity and amplitude of its vibrations. The oral method teaches the deaf to hear, develops the function of auditory accommodation, and awakens the faculty of attention. Both the ear and the spirit are aroused at the same time. The method includes re-education by the voice (directly or transmitted by acoustic tubes); the phonograph; microphonic apparatus; sonorous massage by platinum plates electrically vibrated; the use of sirens; auditory and respiratory gymnastics; diathermia; lip-reading, etc. De Parrel gives a detailed report of 10 cases of loss of hearing acquired in battle. In 9 of the 10 cases remarkable improvement was secured by auditory re-education.

Simulated Deafness.—R. Lake⁷ states that, before the War, simulated deafness was relatively rare, and usually occurred under the Workmen's Compensation Act. One has to deal with two classes of malingerers—those who complain of: (1) *Unilateral*; and (2) *Bilateral* deafness. Simulation of bilateral deafness requires very considerable intelligence and hardihood, and consequently its detection becomes increasingly difficult. It is only by constant observation that people who simulate bilateral deafness can be detected. The testing of cases where malingering of unilateral deafness is suspected becomes a battle of wits. A very careful otoscopic examination should be made, and any signs of aural disease noted. Before commencing the tests for malingering it is as well to blindfold the patient. (1) If the hearing has been entirely lost on the right side, a tuning-fork placed upon the vertex of the skull should be heard on the left side. If such a person is now told to place the finger in his left or hearing ear, he should hear the tuning-fork in that ear even louder than before; but he will more probably say that he doesn't hear it at all, in which case, of course, the fraud is detected. (2) Place two hollow cones of papier-mâché one in each ear of the patient. Two people now speak,

one into each tube, on different subjects and at different paces. If the patient hears with both ears he will confuse the voices, and be unable to understand either of the people talking. If he is able to hear and follow, it indicates that he does not hear on one side.

Kerrison⁸ states a certain number of malingerers have probably been previously coached as to the tests to be employed and the reactions which should be assumed. It is important in dealing with suspected malingerers to give no hint that they are in any way under suspicion. The most glaring evidences of deception should pass without comment until the examination is completed. Complete bilateral deafness is rarely, if ever, claimed. Two types of unilateral deafness are assumed, i.e.: (1) Deafness advanced, but not complete; and (2) Absolute deafness.

METHOD.—Only one patient at a time is admitted. Preliminary testing of the sound ear is essential to a proper interpretation of tests to be applied later. *Sound voice test*: The eyes are blindfolded, and the recruit closes his better ear with a finger. Repeat words and numbers to him, at first in low voice and then in progressively louder and louder tones. If, when one has reached a pitch at which he *should be able to hear the words with the sound ear even though tightly occluded*, he still states that he cannot hear, one knows at least that he is an intentional malingerer. This test will expose many malingerers. *Stethoscope test*: The ordinary binaural stethoscope with funnel-shaped chest-piece is used. One ear-piece is completely occluded with wax. Standing behind the patient, the stethoscope is adjusted with the occluded ear-piece to his 'deaf ear.' Words in a low whisper are spoken into the funnel-shaped chest-piece, which naturally he should hear perfectly. The stethoscope is then replaced, the occluded ear-piece being this time placed in his sound ear. If he is able to hear now approximately as well as before, we have fairly sound evidence that his deafness is either assumed or grossly exaggerated. *Tests eliciting contradictory responses*: The registrant's eyes are now uncovered, the sound or better ear is closed with a finger, and the 'deaf' ear subjected rapidly to the commoner classical tests, e.g., hearing distances for watch, acoumeter, whisper, or conversational voice; tuning-fork tests to determine lower tone-range, etc. His responses are carefully noted. Following this he is again blindfolded, and the same tests are repeated many times, fairly rapidly and in varying order. If he is a malingerer his responses will almost surely demonstrate incongruous and contradictory variations. *Lombard's test* depends upon the fact that to the normal man the sound of his own voice is necessary to the proper regulation of its tone and intensity. The Bárány noise apparatus is adjusted in his sound ear, and its machinery started in order to accustom him to its grating noise. He is given a book, and told to read aloud in his natural voice, and not to stop reading when the noise instrument is set in action. As soon as the noise begins, a man whose opposite ear is profoundly deaf will at once raise his voice, and, if his deafness is absolute, he may literally shout. The malingerer, on the other hand, claiming a one-sided deafness which is not real, will continue to read in an even tone or in a tone only slightly elevated. [This is a test which a malingerer who has been coached may easily turn to his advantage.—J. S. F.]

Teal⁹ describes the following method: The person is blindfolded, and in a friendly, helpful manner, told that if he is really deaf there is no disposition on our part to overlook it. But he is also warned that if he tries to show dishonesty in the test, he is sure to be 'tripped up.' Air-conduction is tested, and of course is negative. The Weber test is then used, and usually (though reluctantly) he hears the fork in the deaf ear. Bone-conduction over the mastoid is next tested, and again he admits hearing the fork. He is then com-

mended for his answers, and assured that he has answered as he should. The real test is now used. After saying one wants to try the last test (bone-conduction) once more, a non-vibrating fork (or lead pencil, flat end) is placed over the mastoid to make him think he is being tested in the same manner, but at the same time a vibrating fork is brought up close to the auricle with the other hand to test the air-conduction. If he is simulating deafness he will of course answer that he hears the fork (under the impression that he hears the sound through the bone), and the fact of a normal path of air-conduction is established. If he is really deaf, he will of course not hear the vibrating fork.

Hurst and Peters have stated (*see* MEDICAL ANNUAL, 1918, p. 181) that if there is deafness following shell explosion, and if the vestibular tests give a normal result, we are entitled not only to arrive at a favourable prognosis, but even to assume that the deafness is of purely functional origin. McBride and Turner believe that very grave injustice might be done if this dictum were accepted. They conclude: (1) That concussion deafness is generally due to some organic change; (2) That the prognosis is usually bad; (3) That the results of the vestibular tests can only be utilized in conjunction with information derived from other sources. Thus, if the patient shows other hysterical symptoms, vestibular tests may perhaps under certain circumstances help diagnosis; but to state that they do more than this is misleading and dangerous.

REFERENCES.—¹*Bull. de l'Acad. de Méd.* 1917, July 3; ²*Laryngoscope*, 1917, Nov., 811; ³*Ibid.* Sept., 661; ⁴*Ibid.* 1918, Aug., 612; ⁵*Ibid.* 1918, June, 497; ⁶*Rev. de Laryngol.*, etc., Paris, 1916, xxxvii, 401; ⁷*Med. Press and Circ.* 1918, Mar. 8, 180; ⁸*Laryngoscope*, 1918, Sept., 662; ⁹*Ibid.* 1918, Aug., 615.

DENGUE.

Sir Leonard Rogers, M.D., F.R.C.P.

C. C. McCulloch¹ gives a good general account of dengue, laying stress on the absence of catarrhal symptoms in distinguishing it from influenza and measles, as well as the presence of Koplik's spots in the latter. He thinks that Rogers's seven-day and Weeks's six-day fevers are probably only dengue.

REFERENCE.—¹*New Orleans Med. and Surg. Jour.*, 1918, March, 694.

DERMATITIS.

E. Graham Little, M.D., F.R.C.P.

Dermatitis from High Explosives.—MacLeod¹ reviews the general experience with regard to exposure to the substances entering into the manufacture of high explosives. The most important of these is *tetryl*, which produces a yellow staining of the skin and in many persons a dermatitis, varying in degree from a slight erythema to a deep-seated vesication and œdema. The mark of the eruption is the restriction of the distribution to exposed parts, but it may occur on sites ordinarily covered if the powder can work its way into the clothing, as for example on the feet. Recurrences are common, but, in contrast with the experience with trinitrotoluene, general symptoms of absorption are absent. The dermatitis usually ceases when the irritant is withdrawn, but the disappearance may be hastened by the application of Calamine Lotion or Zinc Creams. Lead Lotion is to be specially avoided, as it has a chemical affinity for the drug. Prophylactic measures such as the wearing of an overall and protection of the necessarily exposed surfaces with a zinc oxide and starch powder are recommended.

The eruption caused by *trinitrotoluene* is very similar in character to that just described. It is rather more itchy, and is more apt to become pustular. Severe toxic symptoms, including gastritis, jaundice, and anæmia, may be present. The treatment is much on the lines already described above, but it is even more essential to remove the patient at once from the atmosphere

of the drug. *Lyddite* probably owes its irritative action to the picric acid it contains. Its effects are very like those described under the last heading. (Dermatitis from the powder in unexploded bombs was fully described in the MEDICAL ANNUAL, 1918, p. 148.)

Dermatitis from Petrol.—The accident is commonest in aviation crashes, and persons exposed to this risk should be warned to change their clothes immediately. Page² thus describes the clinical effects and the treatment to be followed: The lesion produced resembles exactly a burn or scald of the first and second degree; that is to say, there is erythema and some vesication, with a considerable amount of burning pain. The area involved is often large, e.g., both legs, thighs, and feet. In treatment, grease of any sort increases the discomfort. *Lead Lotion* applied on lint or *Zinc-Carbolic Lotion* (zinc oxide, dr. 3, suspended by glycerin, oz. 1, in 1 per cent carbolic acid solution to oz. 8) sponged on, are the best applications at first. These may be followed by a simple dusting powder when the symptoms subside, a process which is fortunately rapid. The affected limbs should be left uncovered in warm weather, or else a cradle used to support the bed-clothes. The author adds the warning that naked lights are to be avoided in rendering first aid in such accidents.

Rhus Dermatitis.—There is some controversy on the nature of the injurious factor in rhus dermatitis, some observers having concluded that there was a bacterial causation. Two recent papers on this subject establish the chemical nature of the irritant. McNair³ conducted experiments which demonstrated that the action of the poison was not hindered by prolonged heat or exposure to strong antiseptics; and Toyama⁴ claims to have isolated a pure chemical product, urushiol, obtained in crude form from "the sap of the lacquer tree"; native lacquer, especially freshly made, produced a similar dermatitis, and urushiol caused the same clinical effects when applied to the skin. The extraordinary vitality of the irritant is exemplified by an experiment, for the characteristic dermatitis was produced by an ethereal solution of some lacquer found in an antique vase which had remained buried for a thousand years. The poisonous principle is non-volatile, and the apparent conveyance of the effect to persons at a distance from the source of injury is explained by assuming the carriage of particles by wind or insects. Treatment consists in neutralizing the effects of the chemical by the application of a weak *Alkali* such as sodium carbonate, or the following solution: Caustic potash 1, alcohol 80, glycerin 10, water 60. When lacquer itself is the vehicle of the irritant this may be removed by washing the parts with an alcoholic solution of nitric acid 1 per cent, and bathing subsequently with lead lotion.

Strickler⁵ conducted some interesting experiments with the poisons of *ivy*, *sumac*, and *nettle*. These are supposed to be glucosides, which can be extracted by alcohol. One-twentieth c.c. of the product thus obtained was injected into the skin of the patient, and a reaction was obtained within twenty-four hours in the form of a papule or erythema and tenderness of the site injected. The reaction was specific, the patient with an eruption due to rhus poison reacting to the rhus toxin. A small quantity of the toxin, from .3 to .5 c.c., was then injected intramuscularly, and repeated in two days, if necessary. The symptoms in twelve cases so tried receded after the first dose, with no other medication, and two doses often sufficed to cure the eruption completely. In several instances there was conferred a definite immunity to the poison, which, however, did not seem to last long, and fresh desensitizations would probably be necessary; but the results promise considerable benefit from this form of treatment, in the immediate amelioration of symptoms and the conferment of relative immunity.

Dermatitis produced by a Poisonous Moth.—Ohno⁶ has an elaborate study of a poisonous moth found in the summer in Nugata. Contact with the powder from the body or wings produced in the human skin an extremely acute and severe urticaria. In the powder were found peculiar microscopic needle-like bodies, in great numbers, with a pale violet fluid in the lumen, and the irritant effect of the powder may be explained by the mechanical properties of the needles as well perhaps as by the chemical characters of the contents. Many experiments were conducted with cats, dogs, and guinea-pigs, to discover a means of conferring immunity, but without success.

Dermatitis from Contact with a Caterpillar.—Schmitz⁷ reports a remarkable case of an urticaria of extreme severity caused by contact with a hairy caterpillar found in Roumania. The patient was a doctor, who had previously enjoyed good health. The urticarial eruption faded after about five days, but was then succeeded by a very acute attack of nephritis, with blood in the urine, and great constitutional illness. Albuminuria persisted for some weeks.

Dermatitis from Contact with Beetles.—Chalmers and King⁸ report an epidemic occurring in Khartoum, chiefly among Europeans, but also to a slighter extent in Egyptians, in August, 1916, which was traced to contact with blister beetles, two species being identified, belonging to the coleoptera. The epidemic took the form of a bullous eruption, which is common in this month in Khartoum, when these beetles swarm, and they have been shown to eject an irritating fluid. The experimental rubbing of a beetle of one of these species on the skin produced the eruption. Persons attacked are those who spend the evenings in well-lighted open-air cafés. The treatment of the actual eruption should include pricking of the blister as soon as noted, and the application of **Carbolic Acid Lotions 1-80**.

REFERENCES.—¹*Pract.* 1918, 124; ²*Ibid.* 451; ³*N. Y. Med. Rec.* 1917, June, 1042; ⁴*Jour. Cutan. Dis.* Mar. 1918, 157; ⁵*Ibid.* June; ⁶*Japanese Zeits. f. Dermatol. und Urol.* July, vol. xvii, 599 (Summary in German, p. 26); ⁷*Munch. med. Woch.* vol. lxiv, No. 48, 1558; ⁸*New Orleans Med. and Surg. Jour.* 1917, 445.

DIABETES INSIPIDUS.

John D. Comrie, M.D., F.R.C.P.

Moreschi¹ gives a review of the pathogenesis in diabetes insipidus, particularly in relation to the effect which injection of **Pituitary Extract** has in reducing the excretion of urine. He believes that the condition may be due to alterations which lead to under-action of the pars intermedia in the hypophysis, as for example by tumour, tuberculosis, and chronic inflammation of any kind; or alterations in the endocrine glands leading to degenerative changes in the sympathetic nervous system; or alterations in the floor of the third ventricle or in the thorax, mechanically involving fibres of the sympathetic nervous system.

Graham² records a case in which polyuria followed an accident to the head, with a fracture involving apparently the sella turcica. There were also symptoms such as headache and dizziness suggestive of a considerable rise in the intracranial pressure, and the condition was strikingly relieved by **Spinal Puncture**.

Rosenbloom³ records a case in which from 8000 to 9000 c.c. of urine were habitually passed every day. Thyroid feeding was tried without the least effect, and the same absence of result followed the administration by the mouth of pituitary tablet. But when 1 c.c. of **Pituitary Solution** was injected subcutaneously it was followed by a diminution of the urine to about 3000 c.c. next day. The effect of the injection lasted for about twenty-four hours.

REFERENCES.—¹*Políclinico*, 1918, April, 97; ²*Jour. Amer. Med. Assoc.* 1917, ii, 1498; ³*Ibid.* 1918, i, 1292.

DIABETES MELLITUS.*John D. Comrie, M.D., F.R.C.P.*

The significance of heredity in the onset of diabetes mellitus has been studied by Williams.¹ He regards diabetes as a disease of degenerative type, especially connected with a high state of civilization, and though at present of low incidence, nevertheless increasing at a more rapid rate than other degenerative diseases like cancer and nephritis. In Rochester, for example, the death-rate from diabetes, he finds, has increased from 2.9 per 100,000 in 1884, to 17.1 in 1914. He has made a careful search into the family history of 100 diabetics, and has found that diabetes had occurred in 27 either among the parents, grandparents, or collaterals, while in 58 there had been diabetes combined with some other condition like arteriosclerosis, cancer, or obesity. Thus, diabetes had a family tendency in 85 per cent of cases, while among 100 patients ill with other serious diseases he traced diabetes among the relatives in only 8 per cent. Arteriosclerosis is the morbid condition which he finds most commonly associated with diabetes, and next in frequency obesity.

Familial renal glycosuria occurring in four members of one family in a severe degree is described by Jarlov and Kraunsoe.² In two members of the family the sugar had been discovered in the urine at a very early stage of childhood, and it persisted to the extent of from 2.5 to 4.5 per cent. It was reduced but not abolished by rigid treatment, and acetone was generally discoverable in the urine. Nevertheless the sugar in the blood was not abnormally increased, and the patients maintained good health upon ordinary diet.

The rôle of syphilis in producing diabetes is discussed by Williams.³ He quotes various authors who have found syphilis in from 8 to 10 per cent of diabetics; but he considers that this is higher than the usual proportion, and he found a positive Wassermann reaction in 4 only out of 143 diabetic cases which he examined in this way.

The general question of the theories held at the present day regarding the cause of diabetes is discussed by Williamson.⁴ He recognizes its steady increase in recent years; thus, the death-rate in England and Wales from this cause had increased from 59 per 1,000,000 living in 1886, to 130 in 1915. He finds that it is more common in the large towns of the United States than in England, and that it prevails particularly in some places, e.g., Malta, Bengal, Siam, Ceylon, and Tunis. There are three points which he regards, after a careful inquiry in 300 cases of diabetes, as especially frequent predisposing factors. These are: (1) Great and prolonged excess of sweet foods and drinks, which he found in 31 per cent of his cases; (2) Very great and prolonged mental anxiety, worry, and overstrain, or sudden shock, just before the onset of the disease, which he found had taken place in 40 per cent of cases; and (3) Family history of diabetes in 25 per cent. In only 19 per cent of his 300 cases did he find that the disease began insidiously without one or more of these factors. Regarding prevention, he considers that the most important measure is the **Avoidance of Excess of Sugar**, particularly by those who have the family tendency or are subjected to the predisposing mental conditions.

Prognosis.—Various points are brought out by Hornor and Joslin⁵ in regard to the progress of a series of over 1000 cases of diabetes traced by them. In 44 per cent of the fatal cases the patient had succumbed to acidosis, while arteriosclerosis was frequently an important factor. Of the cases which had ended fatally, over 20 per cent outlived the age which was the normal expectation of life at the time they commenced treatment; and the same was true for 10 per cent of the living cases. They found that obesity was universal in the long-lived diabetics, and that in 40 per cent of the living the diabetics had become a minor issue, while only 4 of them required to maintain a rigid diet.

The influence of renal function on glycosuria has been exhaustively studied

by Epstein.⁶ He finds that renal disease (nephritis) need not interfere with the elimination of sugar. Lessened permeability of the kidneys—i.e., interference with the excretion of sugar—in the course of an active diabetes leads to the progressive accumulation of sugar in the blood, and testing the kidney function by means of phenol-sulphone-phthalein in diabetes is a useful procedure, by helping the understanding of the relation between hyperglycæmia and glycosuria. When the glycosuria is much diminished, or disappears altogether, as the result of lessened permeability of the kidneys, it portends the approach of coma. Such a condition appears to be brought about by circulatory disturbance in the kidneys associated with a general cardiovascular asthenia.

Poulton,⁷ in the Goulstonian Lectures, deals with modern views on diabetes and the significance of acidosis. He lays stress in the treatment of acidosis upon **Under-feeding**. Despite the contrary opinion of Joslin, who objects to its use, **Sodium Bicarbonate** is strongly recommended by Poulton to be given either by mouth or intravenously when neutralization of the acid bodies is necessary. He also draws attention to the fact that in long-standing acidosis cases there is a draining of many inorganic substances from the body, and it is a good plan to supply these daily by the mouth in small doses, viz., **Potash, Soda, Lime, and Magnesia**, but it is not so important to supply phosphates, as these arise from the protein of the food.

TREATMENT.—The various lines of treatment proposed are all more or less on the principle of reduction or starvation. Williamson⁸ gives three **Special Diets** which he finds very useful for short periods of about one week at a time; they may be given in any order, and sometimes one is beneficial, sometimes another. One was given in the **MEDICAL ANNUAL** for 1918 (p. 155). The other two are as follows :—

Diet A.—**VEGETABLES AND JELLY.**

Breakfast, 8 a.m.—Coffee or tea with cream or milk. Tomatoes, mushrooms, or onions, lettuce, jelly.

11 a.m.—Jelly.

Dinner, 1 p.m.—Tomato soup. One or two of the following: Vegetable marrow, onions, cabbage, cauliflower, curly green, asparagus, French beans, boiled lettuce, spinach, Brussels sprouts, cucumber, mushrooms. Jelly.

3.30 p.m.—Jelly.

Tea, 5 p.m.—Tea with cream or milk. One or two of the following: Tomatoes, onions, lettuce, cucumber, salad, mushrooms. Jelly.

Supper.—Jelly.

The jellies suitable are: Veal, beef-tea, calf's-foot, lemon.

Diet C.—**CASEIN AND CREAM.**

The patient is given, for seven or ten days only, a glass of casein (or biogene) and cream with water every two hours from 8 a.m. to 10 p.m. The casein preparation, lait-proto No. 6, will probably be the most satisfactory for the majority of patients. A cup of tea or beef-tea, or both, may be also taken, if the patient desires, twice a day. The mixture of casein and cream and water is prepared as follows: One tablespoonful of casein, or lait-proto No. 6, one tablespoonful of cream; mix well in a tumbler with a fork or spoon, then add hot water (or cold, if preferred) very gradually, mixing well until the tumbler is full. (The fluid may be sweetened with saccharin, or flavoured with nutmeg, if desired, or by the addition of a tablespoonful of whisky or sherry.)

Williamson draws attention to the value of **Salicylate of Soda** and **Acetyl-salicylic Acid**, administered in large doses. **Salicylate of Quinine** is another

drug which appears to be of service in some cases, and these drugs are worthy of careful trial if dietetic treatment fails. It may be mentioned in passing that Kramer⁹ points out that acetylsalicylic acid may cause confusion in performing copper reduction tests for sugar. He examined the urine of thirty soldiers who had been given 2 to 4 grms. of this drug during the day, after which the urine of all responded positively to the Trommer test for sugar.

Croftan¹⁰ draws attention to the fact that œdema occurring during the progress of a fasting-cure is a danger sign and indicates that feeding should be resumed. Especially if associated with nausea, headache, and tremors, it leads to coma. It can, however, be prevented by the administration of enemata of **Pancreatinized Oatmeal, Alcohol, and Glycerin**, which prevent the formation of acetone bodies.

Cammidge¹¹ contributes a critique upon the new dietetic treatment of diabetes by fasting, in which he draws certain practical conclusions. He considers that there is more danger of serious acidosis developing during starvation in fat than in thin diabetics. Further, that when acidosis is present, the patient should be prepared for the starvation treatment by being put on a **Fat-poor Diet** for several days before abstinence from food is commenced. In another paper¹² he emphasizes the fact that cases of diabetes in which the sugar disappears on starvation and then quickly returns are often being kept from complete recovery by an excess of fat in the food. He also considers that in future the amino-acid make-up of the proteins chosen for food will probably be found to be of great importance.

In the treatment of threatening diabetic coma, Joslin¹³ lays stress upon **Warmth**, the maintenance of the circulation by **Digitalis**, by **Caffein**, or by **Black Coffee**, administered by the rectum. He recommends very strongly the administration of **Liquids**, in the form of coffee, tea, thin broth, or water, to the amount of one litre every six hours; but, as above stated, he does not favour the administration of alkalies.

For the use of **Uranium Nitrate** in diabetic conditions (p. 8).

REFERENCES.—¹*Amer. Jour. Med. Sci.* 1917, ii, 396; ²*Jour. Amer. Med. Assoc.* 1918, ii, 694 (abstr. from *Hospitalstidende*, 1918, June 5); ³*Ibid.* 1918, Feb., 365; ⁴*Brit. Med. Jour.* 1918, i, 139; ⁵*Jour. Amer. Med. Assoc.* 1918, i, 267; ⁶*Amer. Jour. Med. Sci.* 1917, ii, 103; ⁷*Lancet*, 1918, i, 863, 895 and July 31; ⁸*Pract.* 1918, Jan., 35; ⁹*Jour. Amer. Med. Assoc.* 1918, ii, 783 (abstr. from *Nederlandsch. Tijdsch. voor Geneeskunde*, 1918, May); ¹⁰*Ibid.* 1917, ii, 1962; ¹¹*Lancet*, 1917, ii, 522; ¹²*Brit. Med. Jour.* 1918, i, 393; ¹³*Johns Hopkins Hosp. Bull.* 1918, April, 80.

DIARRHŒA, CHRONIC.

Robert Hutchison, M.D., F.R.C.P.

Friedenwald¹ suggests the following classification of cases of chronic diarrhœa, although he admits that it is incomplete and provisional:—

1. Simple catarrhal enterocolitis.
2. Ulcerative colitis: (a) Amœbic, (b) Bacillary, (c) Tuberculous, (d) Syphilitic, (e) Carcinomatous.
3. Mucous colitis.
4. Simple colonic infections.
5. Intestinal stasis.
6. Chronic appendicitis.
7. Disturbances of the glands of internal secretion: (a) Pancreas, (b) Supra-renal, (c) Thyroid.

8. Diarrhœas of toxic and undetermined origin.

It is sometimes important to differentiate a diarrhœa originating from disease of the large bowel from that of the small bowel. This is especially important when surgical interference is contemplated.

In catarrh of the small bowel, the diarrhœa is less intense and the pains are

colicky in character. The fæces are more acid, and contain unchanged bile and undigested food particles. Mucus is frequently absent, or is present in small amount, and then admixed with the stool.

In those instances in which the diarrhœa originates in the large bowel, the pain is usually associated with marked tenesmus, and is less frequent than in catarrh of the small bowel. The tenderness on pressure is usually felt along the course of the colon, and not in the umbilical region. Gastric disturbances are usually absent in this affection, and the stools rarely contain undigested food. They are ordinarily alkaline and contain mucus and altered bile.

The treatment of the various forms of catarrhal colitis is usually satisfactory. **Diet** is most important. In addition, most patients do best when treated with **Irrigations** (permanganate of potash, boric acid, gelatin, or protargol).

There are three well-marked varieties of intestinal stasis that may give rise to persistent diarrhœa. In the first form, the stasis is due to a dilated cæcum in connection often with a dilated colon, which is frequently prolapsed and which retains its contents for an unusually long period of time. On account of the retention, fermentation is produced, which is followed by diarrhœa. In the second form, on account of the prolonged retention, the fecal masses are channeled, through which the stools pass in a diarrhœal form. In the third form, the diarrhœa is due to a spastic condition of the bowel giving rise to a frequent expulsion of small round scybala.

The lower bowel is constantly filled with these masses, which produce an irritability of the bowel and frequent desire for defæcation. In all of these forms, Röntgen-ray and proctoscopic examinations will quickly clear up the diagnosis.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1917, ii, 1669.

DIARRHŒA, INFANTILE.

Frederick Langmead, M.D., F.R.C.P.

H. Lowenberg¹ opines that in the main it is useless to discuss the etiological relationship of fat, protein, or sugar to acute alimentary disturbances, in so far as any one may be regarded as the primary cause. Depending upon the action of the individual to them, any one or all of them may be the cause, as a consequence of a change in their physical make-up, or in the individual's tolerance. They thus act as irritants, either of themselves or because of the effects which bacteria produce on them. If the physical character of the food can be so changed as to render it acceptable to the intestinal glands with little effort, and consequently to the absorptive apparatus, and if, meanwhile, the cause of the diarrhœa be removed, not only will the latter disappear, but the nutrition will be conserved.

A common error, which leads to disastrous results, or at least to frequent relapses, is a return to milk or milk preparations too soon, for we are unable to change successfully the physical character of cow's milk. Protein is the constituent most susceptible of change, but the fats and sugars cannot be successfully changed or eliminated. He instances many examples of foods of the same elemental composition but of very different physical characters, and shows how the latter influence their digestibility. Much may be gained in the conservation of infant energy and nutrition, in fact of infant life itself, if extra-corporeal changes can be accomplished in the physical nature of the various food elements which will render them more acceptable to the organism and less irritating, without diminishing their nutritional value. This provides practical demonstration in the *mechanical comminution* of food.

TREATMENT.—Bearing in mind the physical conception of diarrhœa, Lowenberg divides its treatment into (1) That suitable for children who have

teeth or are a year or more old; and (2) That for sucklings: (a) artificially fed, (b) breast-fed.

1. For the first group he recommends a period of starvation for twenty-four to thirty-six hours. This removes the cause of the diarrhœa—the milk. **Castor Oil** is not needed unless there be high fever, drowsiness, or other evidence of toxæmia, when $\frac{1}{2}$ to 1 oz. should be given, and repeated if necessary. During the hunger period the child receives no food except **Saccharated Tea** (1 gr. of saccharin to a quart of tea). This is freely administered irrespective of the presence or absence of vomiting. At the end of twenty-four hours the characteristic 'tea stool'—a small, dark-brown, greenish mucous deposit—is passed. From this point onwards he ignores the character of the stools. Should vomiting be troublesome, a single lavage with warm **Sodium Bicarbonate** solution (1 dr. to the pint) may suffice, or $\frac{3}{16}$ gr. of **Calomel** well triturated with a few grains of milk sugar should be placed dry on the tongue every fifteen minutes for about ten doses. During the treatment nothing at all is given by the mouth. The last dose is followed by the castor oil. After the oil has acted, tea feeding is started. Counter-irritation with mustard over the epigastrium is often very serviceable. Other medicinal treatment is not employed except in those cases where the motions are highly acid, when the following prescription is used:—

R Ex. Tinct. Kino	℥x-xv | Mist. Cretæ	3j
Freshly made without sugar, four times daily before food.		

At the end of the hunger period, four meals are given daily:—

6 a.m.: Fat-free broth (6 to 8 oz.).

10 a.m.: (a) Fat-free broth (6 to 8 oz.), plus *sieved* rice or farina, or cream of wheat (about 2 tablespoonfuls); or (b) Fat-free broth plus an egg cooked for two minutes and rubbed into a paste with pulverized bread-crumbs made from stale bread baked dry in an oven.

2 p.m.: Fat-free broth (5 to 6 oz.), plus one-half of a large or one small mashed sieved baked potato, and 2 teaspoonfuls of one or two different kinds of mashed sieved vegetables (Lima beans, celery, spinach, boiled lettuce, carrots, beets, etc.), and one teaspoonful of finely-cut and sieved roast beef, lamb chop, chicken, or fish, with baked bread-crumbs.

6 p.m.: Fat-free broth (6 to 8 oz.), plain, or with 2 tablespoonfuls of mashed sieved cereal.

Between 6.0 p.m. and 6.0 a.m. nothing is given unless it is urgently required, when fat-free broth or weak tea may be used. The latter may always be given between meals as a drink.

The diet usually produces an immediate effect upon the stools, the bowels becoming constipated. When the stools are normal, or nearly so, a cautious return is made to milk, either skimmed milk, albumen-milk or buttermilk being given. At first the milk preparation is substituted for the 6.0 a.m. feed, a few days allowed to pass, and the effect noted. Subsequently, if progress is satisfactory, each meal is gradually replaced by milk, and then the milk feed is increased until the normal amount is attained.

The skimmed milk is first given diluted one-half or two-thirds with water, with the addition of one teaspoonful of flour or powdered arrowroot. The whole is boiled for ten minutes, and sufficient boiled water added to bring the final bulk to one pint. A pinch of salt is added, and the mixture sweetened with $\frac{1}{2}$ gr. of saccharin. Later sugar is gradually added up to 5 per cent, cane sugar being preferred. Gradually the water and other constituents are reduced until undiluted skimmed milk is employed. A gradual return is then made to boiled undiluted whole milk.

To prepare the buttermilk advocated, 2 teaspoonfuls of flour are rubbed up

with 1 pint of water and boiled for ten minutes. The water of evaporation is replaced and a pinch of salt added. The solution is then allowed to cool. One pint of buttermilk is added and the mixture brought to the boil, with constant stirring. Gradually cane sugar is added, 1 dr. at a time up to 8 dr. Later the buttermilk feeds are replaced by boiled undiluted skimmed milk, and eventually by boiled whole milk.

Results with this treatment have been almost uniformly good. In neglected cases time is necessary, especially when the stools contain blood, but the treatment has not been changed. In such cases a daily intestinal irrigation with tannic acid solution (0.5 to 1 per cent) has seemed to do good.

The part of the treatment on which he lays most stress is the *comminution* of the foods, expressed above by the term 'sieved,' and attained by using a very fine-meshed wire tea-strainer. The food is cooked, then washed well and pushed two or three times through the strainer. The ingredients are given singly or incorporated into a mass, and given dry or moistened with the broth.

Fat-free broth is thus made: One pound of meat, preferably mutton, but alternatively chicken, lamb, or beef, is boiled in a quart of water until tender, strained, iced, and the fat removed. The broth is then made up to a quart with boiled water and salted to taste. The egg is cooked by putting it into a saucepan containing boiling water and removed from the fire, for two minutes. It should be opened at once. The cereals are all cooked for three hours in plain water, then removed, strained, salted, and sieved as described. The potato is baked quickly in a hot oven (after its exterior has been pricked full of holes with a fork), damped, and rolled in salt. It is then opened, mashed, and pushed several times through the tea-strainer.

2. With regard to the second group—that of *sucklings artificially fed*—he is not yet able to state whether the same regimen is applicable, but the results have been good in the few instances in which it has been employed. His usual procedure after the preliminary treatment, which is identical with that for older children, is to give skimmed milk in the proportion of one-third of a pint of milk and two-thirds water, boiled with two-thirds of an ounce of laroan, and sweetened with $\frac{1}{2}$ gr. of saccharin, from four to six times in twenty-four hours.

For breast-fed infants he recommends starvation, tea-feeding, chalk and kino mixture, and then a return to breast-feeding at four-hourly intervals.

Gormain Ort² recommends a 'Dry Diet,' the basis of which consists principally of casein and buttermilk. Meals are given every two or three hours during the day—six or seven in the twenty-four hours. Each meal is prepared by mixing one teaspoonful of fresh cheese of the type known as '*Petit Suisse*' or '*Gervais*' (a form of cream cheese) with a pinch of sugar and one to two tablespoonfuls of milk, water, or barley-water. When the whole mass has been rendered thoroughly homogeneous, it is given to the patient. The child usually takes the preparation well. A child of three to five months old should take 2 oz. of cheese in twenty-four hours; if from eight to nine months old, double this quantity. Four to 10 oz. of liquid may be allowed, either milk or water. If the child has been weaned, the diet may be more extensive, but the basis should still be the fresh cheese. Thus:—

7 a.m.: The yolk of an egg beaten up in 2 or 3 oz. of milk, with a little sugar.

10 a.m.: One or two dry biscuits; but this is only allowable if the child has been weaned for some time.

12 or 1: A tablespoonful of cheese, beaten up to a creamy consistency with milk, and a little sugar added.

5 p.m.: One or two dry biscuits.

7 p.m.: Cereals with 3 to 5 oz. of milk.

The total quantity of liquids allowed per diem in this diet varies from 6 to 10 oz. It should be applied strictly for forty-eight to seventy-two hours. It is dangerous to continue it longer. If the case is favourable, improvement soon appears. On the second day there is a notable modification in the motions, and on the third or fourth the effect is completed. If not, it is useless to continue. It is simpler to return progressively to a normal diet.

V. K. Menshikoff³ also describes very successful results by feeding infants with cheese. He employs cheese-curd (*tuorog*) after serious alimentary disturbance from a too exclusive diet of carbohydrate and salt-containing foods (soups and broths), and gives the full details of seven such cases. As an example, a child of nineteen months, weaned at the twelfth month, had signs of rickets, a pale doughy skin, weak pulse, subfebrile temperature, languor and apathy, and cold hands and feet, and passed ten motions daily, which were diarrhœal and contained mucus. Pressure on the ankles left a deep pit. All other food was stopped, and nothing allowed but rice-water with five table-spoonfuls of cheese per litre as a daily amount. In two days the diarrhœa ceased. The general condition had much improved by this time, the hands and feet keeping warm; and by the end of the week there was no evidence of dropsy. Then very gradually the ordinary diet was resumed, adding to the rice-water and cheese small amounts of acorn coffee made with milk, yolk of egg, bread, etc., so that by the end of a month the weight had increased from 7600 to 7700 grms., notwithstanding the intervening loss of 1000 grms. explained by the œdema.

Menshikoff's explanation is that the absence of the salts in the whey of milk and of carbohydrates on the one hand, and the predominance of albumin on the other, make this method of feeding especially advantageous where diarrhœa has resulted from excessive fermentation in the bowels. Under the restriction to cheese, the dropsy promptly disappears, the tolerance of food is increased, and the normal functioning of the tissues is restored. There is no return of the œdema on resuming ordinary diet.

Further examples of success were a baby six months old with pronounced atrophy and diarrhœa after a too exclusive carbohydrate diet; and another child aged two and a half years, debilitated by diarrhœa for two months. Advantages of the cheese diet are that it is inexpensive, accessible to all, and does not require clinical supervision. When the debility from diarrhœa is extreme, the method is contra-indicated.

S. Rosebery⁴ records 53 cases treated by **Chlorine Water** in the following mixture:—

R Aq. Chlori	℥iv	Mucilag. Tragacanth.	q.s.
Quin. Sulph.	gr. $\frac{1}{2}$	Aq. Chlorof.	ad 3j
Salol	gr. iv		

3ss to a child under six months, and proportionate doses for older children.

This was given every six hours for the first twenty-four to thirty-six hours, and then thrice a day until the stools were normal. In addition 10 to 15 min., according to age, of the following mixture was administered twice a day:—

R Ol. Ricini	3j	Tinct. Opii	℥ij
Ol. Olivæ	3j		

The opium has a soothing effect, and helps to induce a much-needed rest, which is an important factor in treatment. **Lavage of the Bowel** with normal saline was resorted to in many cases. In very severe cases, accompanied by collapse, a **Mustard Bath** was first ordered, and followed immediately by injection of **Pituitrin**, $\frac{1}{2}$ c.c., repeated two or three times at intervals of four hours. Then an inunction of warm olive oil was given to diminish loss of heat. **Lavage**

of the bowel was practised two hours after the mustard bath. The diet varied according to the severity of the attack. In the milder cases albumen-water and barley-water were a sufficient modification. In severe cases sherry whey was first given until vomiting ceased.

The majority of cases recovered in four or five days, the very severe in ten or twelve days. In the latter it was often necessary to administer **Brandy** in 10- to 20-min. doses every two to four hours as an additional check to collapse, and in such cases during convalescence, **Thyroid** ($\frac{1}{6}$ gr. t.d.) had been found useful in hastening recovery and increase in weight.

The essential difference in the treatment from that commonly employed is the use of chlorine water, and a comparison between the cases which received this and the remainder has strongly disposed Rosebery in its favour. Clinical results were so striking as to justify its recommendation. Of the 53 cases, there was one relapse and only one death. As soon as the vomiting and diarrhœa had ceased and the children were considered well enough, they were given a milk mixture (adapted to their age and condition), gradually increased in quantity and strength, and their weight was regularly recorded.

REFERENCES.—¹N. Y. *Med. Jour.* 1918, ii, 7; ²*Med. Press and Circ.* 1918, Feb. 13, 125; ³*Russkij Vratsch*, No. 15, 337 (abstr. *Jour. Amer. Med. Assoc.* 1917, ii, 1479); ⁴*Boston Med. and Surg. Jour.* 1917, ii, 789.

DIPHThERIA.

J. D. Rolleston, M.D.

SYMPTOMS.—According to Rue,¹ diphtheria often runs a severer course and is accompanied by more complications in soldiers on active service than in peace time. During the War the association of *typhoid fever* and diphtheria has been particularly frequent. Thus, among 4198 typhoid cases, Rathéry saw 109 associated with diphtheria; and Joltrain, among 4000 cases of typhoid and paratyphoid and 796 of diphtheria, saw 120 cases in which both diseases were present. It was very exceptional for this association to be caused by infection in hospital; in the great majority of cases typhoid fever was already complicated by diphtheria, or diphtheria bacilli were present in the throat of the typhoid patients on admission, and clinical diphtheria subsequently developed. Diphtheria may occur at the onset of typhoid or at the height of the disease, especially in hypertoxic typhoid, or in convalescence. The prognosis is grave. Of the 109 cases of combined typhoid and diphtheria, 32 were fatal—a mortality of 29 per cent,—whereas among the typhoid and paratyphoid cases the mortality was only 11 per cent.

Le Soudier² records a fatal case of *subcutaneous emphysema* in a boy, age 3 years, who had been intubated for laryngeal diphtheria. The operation was difficult, and the tube had to be removed the following morning, when emphysema of the suprasternal fossa was observed. Death took place on the third day, when the emphysema had extended down to the ilium behind and to the supraclavicular fossa in front. At the autopsy, in addition to interstitial and vesicular emphysema there were areas of bronchopneumonia at the base of each lung. No ulceration was found in the larynx. Only two other cases of subcutaneous emphysema in diphtheria following intubation are on record, both of which recovered. The condition is probably due to the rupture of the pulmonary alveoli caused by the excessive respiratory efforts made at the time of the introduction of the tube.

F. M. R. Walshe³ states that a form of localized superficial *cutaneous ulceration* on the hands, forearms, and other exposed parts of the body has been extremely prevalent among troops in the Egyptian Expeditionary Force in 1917-18. There has simultaneously been an outbreak of relatively mild faucial diphtheria, but associated, for reasons inseparable from active

service, with a large proportion of *nervous sequelæ*. Numerous cases of polyneuritis were observed, not associated with any previous illness or history of sore throat, and under conditions in which alcohol, beri-beri, and arsenic could be excluded, but definitely connected with septic sores, infected cuts, and wounds. In most of the cases the cutaneous lesions were healed when the nervous sequelæ appeared, but in six, organisms morphologically and culturally indistinguishable from Klebs-Löffler bacilli were found. Walshe gives the following view of the pathogenesis of diphtheritic paralysis. The initial local paralysis is the result of a lymphogenous circulation, the toxin being carried from the infective focus along the perineural lymphatics to the corresponding cranial or spinal centres. The specific (ocular) and generalized polyneuritic symptoms, on the other hand, are due to the toxin circulating in the bloodstream and thus reaching the central and peripheral nervous system simultaneously.

PROPHYLAXIS.—J. Blum⁴ reports on the results of immunization against diphtheria with a toxin-antitoxin mixture (*vide* MEDICAL ANNUAL, 1914, p. 211; 1916, p. 206), controlled by means of the Schick test in a large institution for children. Having found by the Schick test that among 529 children, approximately one-third were susceptible to diphtheria, he gave these susceptible cases two or three subcutaneous injections of the toxin-antitoxin mixture at the insertion of the deltoid at intervals of one week, in doses of 1 c.c. for children over one year, and 0.5 c.c. for younger children. A subsequent Schick test showed that, whereas before the injections about 80 children were susceptible to diphtheria, ten months later there were only two susceptible. It is thus possible by this method to render a children's institution free of diphtheria.

TREATMENT.—B. S. Veeder⁵ states that the following practice is adopted at the St. Louis Children's Hospital. All patients with clinical diphtheria receive **Antitoxin** on admission regardless of whether or not a culture has been taken. In mild and moderately severe cases from 3000 to 5000 units are given intramuscularly. In all severe or septic cases, and in cases with laryngeal involvement, 5000 units are given intravenously. All cases seen later (fourth day) are given antitoxin intravenously if the membrane is at all extensive.

Intubation in laryngeal diphtheria is discussed by H. B. Sheffield,⁶ who has intubated 64 children for this disease within the last five years, with only one death. He attributes his success partly to the promptness with which antitoxin had been given by the medical attendants, and partly to their having asked him to operate while the patients were still in a fair state of vitality and not at their last gasp, as so often happens in cases sent to fever hospitals. In the rare occasions when there is a return of asphyxia after extubation, unless the dyspnoea is extremely severe, he gives an emetic (**Apomorphine**), or minute doses of **Morphine** and **Atropine** hypodermically, and sprays the throat with a 1 or 2 per cent solution of **Cocaine** until the spasmodic stenosis has been relieved. In cases of 'retained intubation tube' he remedies the difficulty by gradually introducing larger tubes with each re-intubation, and by local attention to the nose and throat.

Garlic advocated (*p.* 3).

C. C. Ballantyne and B. S. Cornell⁷ report on six cases of *diphtheria carriers* among soldiers, in whom persistent treatment with saline irrigations, gargles, or sprays of *Staphylococcus pyogenes aureus* (*vide* MEDICAL ANNUAL, 1913, p. 205; 1914, p. 210) had failed to eliminate the germ. Tonsillectomy by the dissection and snare method was then employed, and adenoids when present were also removed, with successful results in each case. C. P. McCord, A. Friedlander, and R. C. Walker⁸ also carried out tonsillectomy in a number of

diphtheria carriers in an army camp, and found that the organisms rapidly disappeared in all cases after the operation. Chloramine-T (chlorazene) was also given as a gargle three or four times a day, and the gargling was followed by an oily spray of Dichloramine-T of 2 per cent strength. By these means it was possible to reduce the stay in hospital of contact carriers from 55 to 16 days.

REFERENCES.—¹*Thèses de Lyon*, 1916-17, No. 5; ²*Arch. de Méd. des Enf.* 1917, 360; ³*Lancet*, 1918, ii, 232; ⁴*N. Y. Med. Jour.* 1918, i, 209; ⁵*Jour. Missouri Med. Assoc.* (abstr. *Brit. Jour. Child. Dis.* 1917, 219); ⁶*Med. Rec.* 1918, 1917, ii, 1068; ⁷*Brit. Med. Jour.* 1917, ii, 686; ⁸*Jour. Amer. Med. Assoc.* 1918, ii, 275.

DRUG ADDICTION AND INEBRIETY. *Bedford Pierce, M.D., F.R.C.P.*

The active campaign against alcohol in the United States appears to lead to an increase in drug addiction. Edgar¹ says the *morphia habit* is a serious menace in New York. He considers the personal individual treatment of these patients by general practitioners gives better results than institutional treatment. Elimination is best effected in his opinion by the administration of **Hypertonic Salt Solutions**, night and morning, high in the colon. He reduces the drug very gradually—"Never disorganize the mental equilibrium and have the addict complain he is not getting enough." **Strychnine** is given in $\frac{1}{30}$ -gr. doses morning and afternoon, when the morphia is reduced. In mild cases, successful results may be expected in four to five months. "Personality, sincerity, sympathy, with an appreciation of the clinical picture, are assets necessary in the successful application of treatment."

In *delirium tremens with hallucinations*, Hoppe² advises **Lumbar Puncture** as a routine treatment. Directly the hallucinations appear, 30 to 60 c.c. of cerebrospinal fluid are withdrawn. It is always found to be under pressure. The withdrawing of the fluid is followed by a rapid reduction of the delirium, especially in cases which have had a preliminary stimulation by **Digitalis** and **Strychnine** and the administration of **Alkalies**. If the delirium returns, the spinal puncture is repeated. But if it continues, intravenous injection of normal saline solution is recommended. Prolonged **Hot Baths** or **Hot Packs** are given twice daily, but **Chloral** and **Bromide** are sparingly given, and then only at night. In 105 cases there were 8 deaths, whereas in the previous ten years, when the routine treatment was catharsis and sedatives, the mortality was 18.5 per cent.

The subject of *loss of consciousness in alcoholic subjects without the ordinary signs of inebriety* is discussed by Crothers,³ and two cases of murder are referred to, in both of which a plea of irresponsibility was unsuccessful, although the men appeared to be entirely ignorant of what they had done. There was no known motive in either case, but a clear history of alcoholic intemperance without definite drunkenness. Details are given of a man who cunningly wrecked a train by placing an obstruction on the line, in which case there was a history of spirit drinking and of several distinct lapses of memory. Another man, an alcoholic, but shrewd in business affairs, made a queer will and forgot what he had done. These cases Crothers divides into three groups: (1) Those who automatically continue their accustomed work, and have no recollection of it; (2) Those who do strange things, quite unlike their usual behaviour, yet in no way give the impression they are not responsible; (3) Those who perform criminal or outrageous acts, without exhibiting any sign of delusion or delirium or unsoundness of mind. He considers that at least 7 per cent of drinkers have blanks of memory, some of which can never be filled up. An illustration is given of a brilliant lawyer who began to take whisky after typhoid fever, who had a blank in his memory of a year, during which he transacted difficult business and undertook active public work. Crothers

concludes that cerebral automatism, lasting a few hours to several days, occurs in alcoholic subjects not infrequently; that during this state there is lessened responsibility; and that it usually occurs in persons in which some neurosis or psychosis existed before the alcohol was taken.

REFERENCES.—¹*Med. Rec.* 1918, ii, 914; ²*Amer. Jour. Nerv. and Mental Dis.* 1918, 96; ³*Med. Rec.* 1917, ii, 1026.

DUODENUM, DILATED. (*See p. 31.*)

DYSENTERY, AMŒBIC. (*See AMŒBIASIS.*)

DYSENTERY, BACILLARY.

Sir Leonard Rogers, M.D., F.R.C.P.

BACTERIOLOGY.—C. J. Martin and F. E. Williams¹ record further bacteriological work in the Australian base hospital at Cairo regarding the chances of recovering dysentery bacilli from the stools at different periods after the onset of the disease, and obtained positive results in 68 per cent during the first five days; in 17·4 per cent from the sixth to the tenth days; in 6·3 per cent in the eleventh to the fifteenth days; after that time in only from 3 to 1·5 per cent up to the fiftieth day; and practically never at later periods. They attribute the increasing difficulty in finding the bacilli as the cases become more chronic, to other organisms overwhelming the dysentery ones. The same authors, with P. Hartley,² have also studied the value of the agglutination test in dysentery, using Dreyer's standard agglutinable cultures selected for their relative insensitiveness to normal sera. They found that Shiga cases give uniform high agglutination; but in the case of the Flexner group only 40 per cent of the sera of patients from whom the bacillus was isolated agglutinated a single strain of bacilli; but if tested against five different strains, a reaction was obtained with one or more of them in 72 per cent of cases. Normal non-dysenteric sera very rarely gave reactions. W. Fletcher³ has examined the stools of 1000 convalescents from dysentery and typhoid, and found only one Shiga carrier and 2·25 per cent with mannite-dysentery bacilli, but in only one later than the fifth week and in none later than the ninth week after the beginning of the illness. F. W. Andrewes⁴ has carefully examined 100 strains of aberrant suspected dysentery bacilli, with some typical ones obtained from various army laboratories, with a view to their differentiation, and finds that the majority of aberrant forms could be classed as *B. ambiguus*, *B. alkalescens*, or *B. dispar*, which are not true dysentery bacilli, and that when these are separated out very few doubtful strains remained. He found Michaeli's acid agglutination test to be of great value, as it agglutinated non-dysenteric but not true dysenteric bacilli. F. W. Cragg⁵ concludes that the majority of chronic dysentery patients invalided to India from Mesopotamia were bacillary in nature, although the dysentery bacilli can only occasionally be isolated from their stools owing to the lateness of the examination after the attack.

J. Cunningham,⁶ in an instructive paper, entitled "Latent Dysentery," states that by examining with the naked eye daily for ten days the stools of the population of Bengal gaols, he detected mucus in 11·8 per cent. In 70 per cent of these positive observations the mucus was found in the first two examinations, and in 90 per cent at four inspections. Out of 20 cases examined by D. Munro with a proctoscope, either ulcers or blood and mucus were noted. In 26 per cent of these latent cases he isolated dysentery bacilli, nearly always of the mannite group. Such persons are very liable to be attacked with dysentery while in gaol if they remain there long, but such attacks are mostly relapses of a latent dysentery and not new infections. The proportion of persons in whom mucus can thus be detected in the stools may be used

as a 'dysentery index,' and the figure obtained by examining all admissions to a gaol is likely to represent the index for the neighbouring population. The comparative failure of sanitary measures to decrease gaol dysentery greatly is probably due to the admission of such latent cases accounting for many of the attacks, as hitherto only those admitted to hospital for dysentery have been isolated in separate gangs. D. Graham⁷ estimated that 95 per cent of dysentery in the Salonika force was bacillary. He thinks that a cellular mucus with about 90 per cent of pus cells is diagnostic of the bacillary form of the disease. [Amoebic dysentery may sometimes show a very large number of pus cells.—L. R.]

TREATMENT.—The Serum treatment of dysentery has received further trials. D. Graham⁷ advises 60 to 80 c.c. intravenously once or twice daily for the first three days. Gertrude M. Dobrashian⁸ has analyzed the result of treatment by serum and Salines respectively, and also advocates at least 40 c.c. daily for three or four doses given as early in the case as possible, together with salines by the mouth.

PROPHYLAXIS.—H. G. Gibson⁹ has tested on a small scale an antidysenteric Sero-vaccine, which is safe, and produces no negative reaction, while so far the figures give hope of reducing the incidence of the disease. E. R. Whitmore and E. A. Fennel¹⁰ have experimented with a triple Lipo-vaccine, and obtained evidence of immunity in the blood of vaccinated animals and men with doses producing little local or general reaction.

REFERENCES.—¹*Brit. Med. Jour.* 1918, i, 447; ²*Ibid.* 643; ³*Jour. R.A.M.C.* 1918, Jan., 51; ⁴*Lancet*, 1918, i, 560; ⁵*Jour. Ind. Med. Assoc.* 1917, Oct. 17, 301; ⁶*Ibid.* 1918, July, 68; ⁷*Lancet*, 1918, i, 51; ⁸*Jour. R.A.M.C.*, 1918, April, 411; ⁹*Ibid.* 1918, May, 476; ¹⁰*Jour. Amer. Med. Assoc.* 1918, i, 902.

DYSPEPSIA, ATONIC.

Robert Hutchison, M.D., F.R.C.P.

Mallory¹ defines this variety of dyspepsia as a condition in which there is an impairment of gastric tone and motility without organic obstruction. There is delay in emptying, but nevertheless complete emptying occurs. Atony is to be definitely distinguished from motor insufficiency of second grade, in which food residues are still found in the stomach twelve or more hours after a test dinner. He does not think that there is much advantage in distinguishing between impairment of tone only (peristole) in which there is no delay in emptying, and impairment of motility and peristalsis in which delay occurs, as both conditions usually co-exist; nor does he consider that atony can be clearly distinguished from minor degrees of gastroparesis. The chief predisposing causes of atonic dyspepsia are a neurotic temperament and a 'universal congenital asthenia' (habitus of Stillen), along with an environment to which the patient is ill adapted.

The subjective symptoms are so characteristic that a diagnosis can often be made without special examination. A most complete and careful examination should never be omitted, however, for although the dyspeptic symptoms may dominate the clinical field, other conditions, such as incipient pulmonary tuberculosis, chronic appendicitis, or other focal infection, may be present, and should of course receive weighty consideration when the treatment is directed.

The most common symptoms complained of are a feeling of weight, discomfort, fullness or pressure, occurring either while eating or soon afterward, the patients often complaining that they feel too full even before they have satisfied hunger, and that the sensation is present even after soup, milk, or a cup of tea and toast. Nausea, sour eructations, dizziness, and headache occur, and there is often complaint that food is tasted long after it is eaten. The last-mentioned symptom leads the patient to think that certain foods disagree, with the result that first one article and then another is omitted until the diet

is entirely inadequate and malnutrition develops, with the establishment of a vicious cycle. Digestants, sedatives, and analgesics fail to give relief, unless one of them contains some ingredient that will produce belching, which nearly always affords some temporary relief. The patients complain of a feeling of general weakness, fatigue, and lassitude of the body, with mental torpor and inability to concentrate the attention on work, especially for two hours after meals. Actual pain and vomiting very rarely occur in uncomplicated atony. The appetite is quite variable, both with regard to the quality and the quantity of food desired, and the ability to take certain foods varies from day to day. That is, a meal of certain composition can be taken and digested without discomfort on one day, and a few days later the same food will cause marked discomfort. Constipation is common but not constant. After a test breakfast the amount withdrawn is often increased above normal, and after a test dinner there is more definite evidence of impaired motility. In well-established cases, food remains are found seven hours after the meal, but the stomach is found empty twelve hours after eating. The acidity is normal, or varies only very slightly above or below normal. Blood and other abnormal constituents are absent.

On röntgenographic examination, the stomach is found to be of the fish-hook type, and the gas bubble is large. When examined with the fluoroscope, the barium mixture, without the usual preliminary hindrance to filling in the upper part of the stomach, sinks rapidly to the caudal part, while the pars media remains empty and collapsed. After 1 or 2 oz. of the mixture are taken, the patients often complain of fullness, saying that they cannot swallow any more as the stomach is already full. Peristole, or the ability of the stomach to contract tightly about its contents, is impaired, as shown by a large gas bubble, and peristaltic action is sluggish. The stomach is nearly always ptosed to a varying degree, but it is a noteworthy fact that neither the impairment of motility nor the subjective symptoms are always proportionate to the degree of ptosis. Position is not a measure of function.

There is little difficulty in recognizing atonic dyspepsia if the history is taken carefully and the symptoms are studied intelligently. The false diagnosis of gastritis is the error most frequently made, though it has also been treated as gastric ulcer, with the result of producing increased debility instead of improvement. The most serious error that can be made is to overlook some underlying disease, such as chlorosis, nephritis, or early pulmonary tuberculosis.

The course of the disease is variable from week to week, with a tendency to become progressively worse. Physical fatigue and mental stress increase the severity of the symptoms, while rest and relaxation produce some amelioration. Under the most favourable conditions the disease is essentially chronic.

The chief difficulty in the treatment is to adapt the patient to his environment. One well-known method is the **Rest Cure**. The results of this are often brilliant, but the patient is very prone to relapse when he returns to his usual surroundings. The writer prefers a more gradual method, in which the patient is allowed to continue the normal occupation, business, domestic duties, or social activities, but in a slightly modified form. Sufficient time must be allowed for meals, excessively long hours and night work avoided. If possible, an hour of rest should be taken after lunch and a half-hour rest before dinner. If the patient is a woman, the household duties may be readjusted and social activities reduced to such an extent as to provide time for one or two periods of rest during the day. It is most important that the meals be taken without hurry and confusion. The excitement, tension, and anxiety associated with formal lunches and dinners, or with seeing the children off to school, has a most pernicious influence, and should be eradicated as far as possible. Dietary errors

should be sought for and, when found, corrected. The errors are numerous and peculiar. One patient ate six apples each night, and another drank milk exclusively. The patients, guided now by the advice of friends or something they have read, now by their subjective sensations, make many experiments, but rarely follow any one course long enough to determine whether it is good or bad. The tendency is toward a diet of soup, milk and broth, and raw eggs. The Diet really needed is one of highly nutrient value and little bulk. Since the stomach rebels at a normal amount of food at any one time, the alternative is frequent small meals, with a gradual increase in amount. It is especially important that the lunch be adequate in amount, and ample time allowed for eating. Discomfort will be present at first, no matter what food is taken; but with encouragement and intelligent direction the patient may usually be persuaded to continue to eat adequately, especially if a thorough study of the case has been made before treatment is begun. The forced feeding should be continued despite the discomfort. Only real pain or vomiting should indicate a relaxation and change. The often-quoted advice to "take exercise, drink plenty of water, and get the fresh air," is vague, indefinite, and often harmful. Since such patients are already below normal weight and find difficulty in taking and assimilating a sufficient amount of food, exercise should be reduced where it is possible, and that taken should be in the form calculated to correct some special weakness or restore normal posture and carriage. When improvement is manifest, exercise may be cautiously increased by allowing participation in exhilarating games and dancing, always stopping short of fatigue and following the exercise with a period of rest.

An **Abdominal Support** is of great value; but in order to be effective it must be carefully and accurately fitted, and the patient must be instructed as to how it is to be applied and what is intended to be accomplished. The fact that such supports do not restore the stomach to what is considered its normal position, as revealed by röntgenoscopy, does not negative their usefulness.

In every case it is important to impress upon the patient the necessity of maintaining the improvement in health that has been gained, as any unusual mental or physical stress is apt to be followed by a return of the symptoms.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1918, i, 1442.

EAR AFFECTIONS AND MILITARY SERVICE. (*See also* DEAFNESS, SIMULATED; AVIATION, THE EAR IN.) *John S. Fraser, M.B., F.R.C.S.*

Purulent Otitis Media in Soldiers (Malingering).—McBride and Turner¹ point out the dubious advantage of enlisting men who suffer from middle-ear suppuration. The existence of a condition which may at any moment give rise to serious complications makes it possible for them, if they so desire, to spend much of their time in hospital. If such a patient complains of headache, giddiness, and nausea, even the expert will often find it difficult to distinguish between real illness and malingering. It is impossible for a soldier on active service to have his ears properly attended to. Shuter² emphasizes the same view, and says that it is an economic mistake to pass men for active service who suffer from discharging ears or destruction of the drum membrane. Under the stress of camp and trench life, even cases that have been long quiescent become active. The man is useless as a soldier, and becomes an encumbrance to the medical department. [All cases of middle-ear suppuration must not be placed in the same category. Many are not dangerous, and do not disqualify a man from military service.—J. S. F.]

Artificial Ear Lesions in Military Service (Malingering).—In the majority of cases, according to Gradenigo,³ moderately caustic substances are employed and only a diffuse external otitis is produced. In the present War, benzine,

easily procured from automobiles, is much used. Among other agents are turpentine, croton oil, dilute acids and alkalies, or perchloride of iron. Irritant vegetable juices are in common use; less frequently tobacco juice or match-heads are employed. In other instances, perhaps more numerous, otitis is produced not by instillation but by the application of caustics to the orifice. This causes ulceration, the lesions being pretty regularly arranged around the meatus, and extending for $\frac{1}{2}$ to 1 cm. on the walls of the cartilaginous part, and also involving the concha and tragus. They do not reach the deeper parts of the meatus or the membrane; this, says Gradenigo, is a point of the utmost importance. In slight cases there may be only transient superficial ulceration. A characteristic feature is that the surface is at first covered with a whitish pulpy mass, consisting of macerated epidermis and pus; this is very adherent, and its removal lays bare an ulcerated surface, which bleeds readily. If the caustic action has been severe, a whitish eschar forms, which separates many days after the injury, exposing the deep parts of the derma and sometimes the cartilage. In that stage there is more or less violent inflammatory reaction of the adjoining parts of the walls. Suppuration occurs, and later, granulations, which grow inwards and quickly tend to block the lumen of the meatus. If left to themselves stenosis follows and even complete obliteration of the passage. The presence in recent cases of (1) Eschars, particularly when they extend all round the meatus; the fact that (2) The burns are hardly ever limited to the meatus, but also involve the concha and sometimes the pre-auricular region, the cheek, or the chin; and (3) The intense inflammatory reaction, are sufficient for diagnosis. After a few days, however, when the sloughs have come away, leaving ulcerated surfaces, there may be difficulty. If the lesions are sharply limited to the meatus and external parts, and the tympanic membrane is intact, artificial otitis may be diagnosed with certainty. There is more difficulty when, as happens after the instillation of caustic liquids, the walls of the meatus, even in the deeper parts, participate in the morbid process, and there is a perforation of the membrane with suppuration of the cavity. It must be borne in mind that under the conditions of active service, and the neglect of the most elementary personal cleanliness, a chronic purulent otitis in a soldier easily becomes acute, and the discharge, stagnating many days, or even weeks, in the passage, causes inflammatory lesions of the walls and meatus. As such men are as a rule in the upright position during the day, the irritating secretion collects in the dependent parts, and the greatest changes are seen on the inferior wall. Ulceration on the upper, particularly the anterior, wall of the meatus should give rise to suspicion. An important feature of artificial external otitis is the rapidity with which cure of the lesions takes place when further irritation is prevented by the application of suitably-marked **Starch Bandages**. Genuine ulceration is made worse by this means owing to the retention of pus. The unwillingness of malingerers to furnish information as to the origin and symptoms of their affections is in itself a suspicious sign.

REFERENCES.—¹*Lancet*, 1918, ii, 73; ²*Med. Jour. Austr.* 1917, Sept. 29; ³*Arch. Ital. di Otol. Rinol. e Laringol.* 1917, June.

EAR DISEASES. (See DEAFNESS; EAR; LABYRINTH; OTITIS MEDIA; VERTIGO.)

Ionic Medication in ear conditions (p. 22).

ECLAMPSIA.

W. E. Fothergill, M.D.

TREATMENT.—ROSS McPherson¹ writes that, in spite of various attempts to interest physicians in the medical treatment of eclampsia, the radical operation is still in vogue. But the mortality with operative treatment is deplor-

ably high, being at least 25 to 30 per cent, while reasonably conservative management gives much better results. For example, the report of the last 15,774 cases delivered at the Sloane Maternity shows a mortality in eclampsia of 14.5 per cent. McPherson now gives the results of a second series of cases treated in the New York Lying-in Hospital. The mortality in the first series was 8.5 per cent, and in the second 9 per cent. The treatment used is as follows:—

Immediately on entrance to the hospital, the patient's blood-pressure is taken, a catheterized specimen of urine secured, and she is put into an isolation room which is darkened and as much quiet as possible obtained. She is then given by hypodermic injection $\frac{1}{2}$ gr. **Morphine Sulphate**, her stomach is washed out, 2 oz. of **Castor Oil** is poured down the tube at the end of the lavage, and she is given a colonic irrigation of 5 gallons of 5 per cent **Glucose Solution**.

If the blood-pressure is over 175 systolic, **Phlebotomy** is done, and a sufficient quantity of blood is extracted to bring the pressure down to 150; normal saline is not injected. In the opinion of the writer it is unwise to bleed the patient if the pressure is lower than 175 systolic, as if, for any reason, a good deal of blood is lost during the delivery, the pressure will be reduced so low that the patient may die from shock. The same objection applies to the ante-partum administration of large doses of *veratrum viride*.

The patient is now kept quiet, and $\frac{1}{4}$ gr. morphine administered every hour until the respirations drop to eight per minute. At this time convulsions have usually ceased, the patient will have fallen into labour, and, as has happened in practically all our cases, will be delivered normally or by an easy low forceps in a short time. Occasionally, the use of a little ether is necessary to control the convulsions while waiting for the effect of the morphine. The convalescence is treated in the usual manner, as indicated by the symptoms.

J. C. Edgar² states that from being an advocate of active surgical treatment of eclampsia he is a convert to the use of **Morphine** and moderate conservatism. He keeps up moderate perspiration for several hours by placing over the patient, who is wrapped in blankets, an arrangement of **Electric Lamps** in a rack. This is found preferable to the use of the usual hot wet pack. The stomach is washed, and **Castor Oil** or **Magnesium Sulphate** is left in it at the end of the lavage. The colon is freely irrigated with a solution of **Glucose**. Discussing the artificial emptying of the uterus, Edgar points out that eclamptic patients are the worst kind of surgical risks, being most susceptible to shock from operation, from cardiac depressants such as *veratrum viride*, from phlebotomy, and from excessive sweating. He says it is a clinical fact that the shorter the time between the first convulsion and the emptying of the uterus, the better is the prognosis for both mother and child; but better an expectant attitude with reliance on morphine and eliminative measures than a shock-producing operative delivery. Difficult forceps, forcible dilatation of the cervix, incisions of the cervix, and vaginal hysterotomy at term have no place in the modern treatment of eclampsia. Low forceps delivery is admissible; ether is the only anæsthetic; dilatation of a soft, partially dilated cervix to permit of forceps delivery is allowed.

Cæsarean Section at term and **Vaginal Hysterotomy** in the middle third of gestation have their indications. The primipara with an undilated cervix should be spared a long spontaneous labour by Cæsarean section, and this operation is preferable to difficult version in a transverse case or to difficult delivery per vaginam in moderately obstructed labour of any origin. Edgar would also use Cæsarean section at term and vaginal hysterotomy in the middle third of pregnancy for primiparæ who present the clinical picture of profound toxæmia, namely, scanty urine loaded with albumin, casts, and,

especially, blood; frequent convulsions with coma between them; retinal changes and hæmorrhage; also cyanosis persisting between convulsions. He regards Cæsarean section, in short, as a substitute for the more shock-producing methods of securing rapid delivery.

F. J. McCann³ gives the following indications for Cæsarean section in cases of eclampsia: (1) When the fits are severe and recur in rapid succession; (2) When labour has not commenced; (3) When the cervix is difficult to dilate from elongation, hypertrophy, or excessive rigidity; (4) When the mother is moribund and the fœtus living and viable; (5) When labour has commenced, and there is found considerable disproportion between the size of the child and that of the pelvis; (6) When the surroundings of the patient are suitable for a major surgical operation, and when the services of an operator skilled in pelvic surgery can be obtained.

Clifford White⁴ points out that *suppression of urine*, in some cases of pregnancy toxæmia, is caused by pressure on the collecting tubules due to increased tension inside the fibrous capsule of the kidney. It can be treated successfully by **Nephrotomy** after symptoms have persisted for many days. He therefore suggests prophylactic incision of the capsule of the kidney as an addition to Cæsarean section for eclampsia in suitable cases. The writer has used this method with success in six cases, in all of which urine was passed freely from the time of operation. The Cæsarean operation is finished in the usual way, but through an incision made so that two-thirds of its length are above the umbilicus. The wound is then easily retracted upwards and to the right, and the peritoneum lateral to the ascending colon is incised for five inches. The colon is turned towards the middle line and the kidney exposed. An incision through the renal capsule is made along its convex border for the whole of its length, a superficial portion of the kidney substance being cut through, as it is impossible to limit the incision to the capsule. A small drainage tube is passed through the skin of the loin, the colon is replaced, and the abdomen closed. In an easy case (i.e., when the patient is not fat) the nephrotomy does not add ten minutes to the duration of the Cæsarean operation.

REFERENCES.—¹*Amer. Jour. Obst.* 1918, Jan., 58; ²*Jour. Amer. Med. Assoc.* 1918, i, 1265; ³*Brit. Med. Jour.* 1918, ii, 145; ⁴*Ibid.* 14.

ECZEMA IN CHILDREN.

E. Graham Little, M.D., F.R.C.P.

White¹ comments on the frequency with which children are dressed too warmly, a condition which favours intertrigo and miliaria. Clothes should be changed more often, and baths in cool water taken. The frequent application of this lotion is useful: Acid Carbol. 2, Zinc Oxide 16, Ac. Calcis 250. When this dries, the parts may be dusted with borated talc powder. Balanitis may be treated with **Black Wash** (hyd. chlorid. mitis 2, ac. calc. 250), which should be applied by means of thin strips of linen soaked in the lotion and kept in position for fifteen minutes three times a day. Paronychia may be treated with the same wash, with the application in the intervals of an ointment such as Boric Acid 2 to 4, Adip. Benz. 30, under a thin finger-stall.

Pediculi of the scalp hair are most conveniently destroyed by washing the scalp with **Xylene**, which, however, as it is highly inflammable and sometimes produces irritation of the skin, should be used with care. Eczema in children is frequently of the 'madidans' type, and for this White is enthusiastic in recommending **Crude Coal Tar**, which he uses thus: Crude coal tar 2, zinc oxide 2, amyli maidis 16, vaseline 16. This mixture is smeared thickly on the parts affected, and no dressing placed over it. Every day the old paste is removed gently with soft gauze soaked in oil of sweet almonds,

and fresh application of the tar made. On hairy parts the tar is apt to produce follicular pustules, which may be avoided by closely cutting the hair prior to the treatment. For papular eczemas greases are contra-indicated, and the following wash is advised in acute cases: Amyl maidis 25, talc 25, glycerin 20, liq. plumbi subacet. 100, aq. dest. 250. For chronic conditions, liq. carb. deterg. 80, aq. dest. 250, is to be preferred. In dry scaly eczema, especially about the mouth, this ointment is very successful: Acid. salicyl. 65, bism. subnit. 2 to 4, aq. rosæ 30.

In eczemas not amenable to external treatment—and this can be judged by effects after a fortnight's trial—deeper causes are to be suspected. In such cases *testing of food reactions* is strongly recommended. This is done in the following way. The flexor surface of the arms of the affected subject was cleaned, two parallel rows of four or more incisions were made superficially with a fine scalpel, and into the incisions of one row were gently rubbed the particles of food to be tested, while the others were left undisturbed and served as controls. The arm was observed at intervals up to a half-hour, and a lightly positive reaction was considered to consist of reddening and infiltration; a positive reaction of definite papulation and a double positive were recorded when these characteristics were still further accentuated. Milk freed from its fat content was chosen to represent the most important food of childhood, salt-free butter to represent fats, egg-albumen to represent proteids, and lactose or oatmeal-water to represent the sugars and starches.

More complicated foodstuffs should be prepared before being tested, in the manner detailed below: (1) Render food to a fine mass, add water, and allow to stand in a cool place for two days. (2) Filter, and to the watery extract add four volumes of 95 per cent absolute alcohol. The alcohol throws down a precipitate. (3) Filter and wash the precipitate: (a) with normal saline solution, (b) with 95 per cent alcohol twice, (c) with ether twice, and (d) allow to dry in a powdered form.

In addition to food reactions, much help may be afforded by *study of the fæces*, for which the following directions are given:—

Macroscopic.—(1) Note the colour, odour, and consistency. (2) Look for mucus and for food residue, such as cellulose from vegetables, meat fibres, or gelatinous masses of undigested starch. (3) Reaction to litmus: of considerable value in babies, but of little importance in adults.

Microscopic.—(1) To disclose neutral fat, rub up a small amount of fæces with water on a glass slide, and add a few drops of saturated solution of Sudan III. Neutral fat globules stain a bright orange-red. Any neutral fat is abnormal. (2) To determine 'total' fat add 1 to 2 drops of glacial acetic acid and a few drops of Sudan III, and heat. In this way all fat present is broken down into globules of fatty acids which stain a bright orange-yellow. All stools contain a not inconsiderable amount of 'total' fat, for which there is no acknowledged standard of measurement. Experience alone determines one's own standard. (3) To discover starch, rub up a small portion of the mass with water and add Lugol's solution. Starch granules become blue, and anything more than the smallest amount of starch is to be considered abnormal.

Eighty-seven cases of eczema tested with food reactions and thirty-one tested fæcally are described in some detail; 66 per cent positive results were obtained as regards food, and 81 per cent as regards fæces. Food plays an important part in the production of eczema, especially in children.

Edelman² reports a case of chronic eczema of three years' standing in a child of three and a half with a 'cretinoid' aspect, in which the eruption improved enormously within a week with administration of half a grain of

Thyroid Extract three times a day. The eruption relapsed when thyroid was withdrawn, and was ultimately cured within three months by continuing the drug, increased after a month's trial to one grain *ter die*.

REFERENCES.—¹*Boston Med. and Surg. Jour.* 1918, i, 5; ²*N. Y. Med. Jour.* 1918, i, 450.

ECZEMA, SEBORRHOIC. (See SEBORRHOIC ERUPTIONS.)

EMBOLISM AND THROMBOSIS, POST-OPERATIVE.

W. I. de C. Wheeler, F.R.C.S.I.

There is no tragedy in surgery greater than sudden death from pulmonary embolism, following a simple operation such as, for example, myomectomy. Charters Symonds¹ states that it is in cases of mild phlebitis that the detached blood-clot is formed. Where a vigorous sepsis occurs, with even double thrombosis of the legs, the clot is adherent and not likely to be detached. Post-operative pulmonary embolism is seen in connection with operations on the abdomen, including the inguinal canal and scrotum. He recommends free movement after operation, and deprecates the adoption of the dorsal position, with knee-pillow, after abdominal operations. The hips and knees should be moved, and the patient allowed to turn on his side as soon as possible. He summarizes his paper as follows: (1) Pulmonary embolism does not occur after operation above the diaphragm; (2) Nor in children; (3) The common factor in the after-treatment of these two examples is freedom of movement; (4) Usually after abdominal operations movement is restricted, the dorsal position is enforced, and the knee-pillow adopted; (5) It is suggested that this practice determines massive thrombosis by slowing circulation; (6) It is suggested that the above restrictions should be abandoned, together with the knee-pillow position, and daily movement insisted upon.

Laphorn Smith² thinks that post-operative pulmonary embolism is due to the condition of the blood, principally a hyperfibrinous condition, and for this he recommends that all patients should be allowed to drink water freely. Smith also points out that post-operative embolism is nowadays very rare, 47 deaths having occurred from it at the Mayo clinic in 63,000 operations. In past days the patients were prepared by drastic hydragogue catharsis, and hæmorrhage was more abundant.

McCann³ urges the surgeon, in order to prevent pulmonary embolism, not to transfix or puncture blood-vessels, not to tie or stitch too tightly, and to obtain accurate hæmostasis, leaving no blood-clots. He has never had a case of post-operative embolism or thrombosis since transfixion was given up and anatomical operating—picking up vessels cleanly and ligaturing them without encompassing masses of tissue—was uniformly practised. He therefore states that "Never transfix a vascular area" should become a surgical axiom.

REFERENCES.—¹*Brit. Med. Jour.* 1918, i, 334; ²*Ibid.* 644; ³*Ibid.* 277.

EMPHYEMA.

H. S. Pendlebury, F.R.C.S.

All the recent work on emphyema aims at *preventing* or *curing* persistent fistulæ. For the *cure* of persistent fistulæ, see under THORAX, WOUNDS OF.

TREATMENT.—With the object of preventing fistulæ, Rinehart and A. W. Oelgoetz¹ advocate in acute cases, frequent **Aspiration**, whenever there are signs of fluid, and the subsequent injection of **Formaldehyde** and **Glycerin**. They claim that by this method no collapse of the lung occurs, there is no deformity of the chest, and convalescence is greatly shortened.

W. Whittemore² treats desperate cases as follows: Under a local anæsthetic he inserts a large trocar. Through the trocar a fine catheter is then passed, and the trocar is removed. The catheter is attached to a long rubber tube,

which passes into a bottle half filled with water. Thus the negative pressure in the thoracic cavity is not altered. At the end of five to six days, an **Electrical Suction Apparatus** is attached, and continuous suction is applied. When the amount of pus that is drawn off each day does not exceed 2 oz., he removes all drainage. He states that this procedure will clear up cases in which only a cloudy serum has formed. If thick pus and lymph are present, he advises **Lillenthal's Operation**. This consists in opening the chest by a long incision, spreading the ribs with a 'spreader,' sucking or mopping out the pus and lymph, and removing the pyogenic membrane that is found covering the visceral and parietal pleura. The lung is then forced to expand by the use of positive pressure with the anæsthetic, either by using intertracheal ether, or gas and oxygen. The wound is sewn up, leaving a cigarette wick at either end. It is stated that cases so treated heal in two to three weeks. Operation by this method is advised as soon as the diagnosis is made. By the use of this operation it is claimed that the mortality has been reduced from 20 to 12 per cent.

In cases of *encapsulated empyema* which cannot be definitely located. Whittemore advises an exploratory **Thoracotomy**. On finding adhesions, which indicate the site of the abscess, he walls off the rest of the chest, as in abdominal surgery, and proceeds to drain the abscess. He says: "I believe an exploratory thoracotomy should be done as readily as an exploratory laparotomy. The thoracic cavity may be opened and explored just as safely as the abdominal cavity. And if nothing pathological is found, it can be closed up tight and the patient recover just as readily as from an exploratory laparotomy. It is better to do this exploration under positive pressure, as this will prevent the collapse of the lung when there are no adhesions present." He thinks the prone position is the best for all these operations. For *chronic empyema* he advocates **Schede's Operation**, with decortication. For all cases he prefers to use paravertebral anæsthesia, with gas and oxygen or intertracheal ether. For acute cases, the positive pressure that can be obtained with gas and oxygen is sufficient; but for chronic cases, in which decortication has to be performed, he advises intertracheal ether, as a greater pressure can be thus obtained.

Tuffier³ and G. A. Stewart⁴ report excellent results in acute cases, with early operation, drainage, and the sterilization of the pleural cavity with **Dakin's Solution**, and closure of the chest wall when sterility has been obtained.

H. McKenna⁵ prefers to treat acute cases by inserting a rubber catheter, sucking out the pus, and running in half the quantity sucked out of Dakin's solution. If the pus is too thick for aspiration, a little Dakin is run in, which liquefies the pus. He finds a useful method of draining substernal pockets is to trephine the sternum, or to resect the 4th rib.

I. S. Dauriac⁶ treats acute cases by continuous drainage with a negative pressure. The drainage tube is connected to a reservoir above the bed, dripping into a receiver, thus creating a vacuum in the pleural cavity.

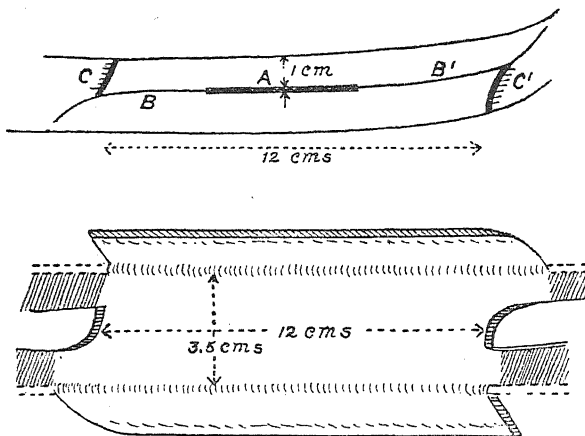
R. Atkinson Stoney⁷ advocates the Carrel-Dakin method, and states that the Schede operation and decortication are unnecessary and dangerous.

The Empyema Commission⁸ working at Petersburg, Va., plead for delay in operation on early cases, and state that the mortality is thereby diminished. They advocate aspiration early in the disease, followed at a considerably later date by drainage and Carrel-Dakin sterilization. They have arrived at the conclusion that the grave condition of the patient in early cases is more probably due to the pulmonary and toxic conditions, than to the pleuritis, and that early operation is attended with grave risks. It is therefore most important, they say, to tide the patient over the acute condition, relieving

distress by aspiration if necessary, and to leave operation until the patient is in a more favourable condition. They state that Schede's operation and decortication should only be undertaken after prolonged efforts to make the lung expand by other means. They find that the nitrogenous excretion is markedly increased during the acute stages, and that the corresponding weakness and emaciation can be avoided by increasing the diet to 3000 or 3500 calories.

I. R. Roth⁹ has devised a *bed for empyema cases*. It consists of a hammock slung across the tops of the bed-posts, with a hole in the middle, through which the drainage tube can pass into suction bottles, placed on the bed, below.

The Prevention of Permanent Bronchial Fistulæ following Lung Resection.—H. Lilienthal¹⁰ states: "After lobe resection for chronic inflammation a temporary bronchial fistula may be expected. The fistula will probably close spontaneously. It appears that as a general principle we may assume that, other things being equal, a bronchial fistula is apt to close in direct proportion to its distance from the body surface."



Figs. 50, 51.—Plastic transcostal thoracotomy (E. M. Cowell).
(Retraced from the *British Medical Journal*.)

Plastic Transcostal Thoracotomy.—E. M. Cowell¹¹ has devised a method whereby it is a simple matter to close the chest completely, after thoracotomy, "in a few minutes, as against the ten to fifteen minutes or more of the usual methods." A rib is exposed for about 5 in., and a cut made (A) longitudinally in the rib with a saw so held that bevelled edges are made to the rib incision. This incision is continued as B B'. Cuts C and C' are then made, and the two pieces of rib with attached pleura are turned outwards on the hinge of intercostal tissue as in Fig. 51. On closing the wound, the portions of rib are returned to their normal position, the edges overlapping and forming a perfectly airtight closure. This procedure can be modified where drainage is required. A trephine hole is then made in the rib to be sawn, and B and B' are then made on either side of the trephine, and the operation continued as above.

The Rôle of the Scapula in Thoracoplasty.—J. E. Adams¹² publishes a case of non-expansion of the lung following an empyema, treated in the following way: Portions of the 6th, 7th, 8th, and 9th ribs on the back of the chest were

resected, cutting the muscles to gain access to them so that large flaps of latissimus dorsi, trapezius, and rhomboideus major were left attached to the scapula; 6 in. of the 7th and 8th ribs, 2½ in. of the 9th, and less of the 6th rib were removed. An open trough was thus formed, in which the collapsed lung was seen lying at the bottom. The muscular flap attached to the scapula was next sutured to the lower portion of the lung and diaphragm, and the scapula was pushed into the cavity so that it occupied approximately the place of the resected ribs. "The object of this procedure was to lessen the size of the pleural cavity, and to secure for the lung a space, half the size of the original pleural cavity, which it might be able to fill, when its expansion was aided by the movements of the arm, and the pull of the muscles passing from scapula to lung." The results of this procedure are stated to be excellent.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1918, July 17; ²*Boston Med. and Surg. Jour.* 1918, March 14; ³*Bull. de l'Acad. de Méd.* 1917, July 10; ⁴*Med. Rec.* 1918, Aug. 10; ⁵*Jour. Amer. Med. Assoc.* 1918, Aug. 31; ⁶*Bull. de l'Acad. de Méd.*, 1917; ⁷*Brit. Med. Jour.* 1918, Feb. 16; ⁸*Jour. Amer. Med. Assoc.* 1918, Aug. 10; ⁹*Ibid.* 1918, May 18; ¹⁰*Ann. Surg.* 1918, May; ¹¹*Brit. Med. Jour.* 1917, Nov. 3; ¹²*Lancet*, 1918, Sept. 4.

ENCEPHALITIS, EPIDEMIC.

S. A. Kinnier Wilson, M.D., F.R.C.P.

A very unusual and at first somewhat disconcerting feature of the medical year was the outbreak in epidemic form, during the earlier months of 1918, of a variety of encephalitis. The disease occurred both in urban and rural practices, and cases were reported in various parts of England and to a considerable extent in London and its suburbs. Attention was at first directed to these cases by Dr. Wilfred Harris, London, and Dr. Hall, Sheffield, in the *Lancet* on April 20. Certain of the clinical symptoms bore a resemblance to those of the condition known as botulism, due to poisoning from the ingestion of food contaminated by *B. botulinus*, and as the suggestion was made that tinned foods might be etiologically incriminated in these first cases, supposed to be genuine cases of botulism, public attention was aroused and the elements of a 'scare' were soon to the fore. A circular was issued by the Local Government Board directing the notice of the profession to the disease, at the same time couched in suitably non-committal terms as to its exact nature. Ere long, the multiplication of cases and adequate consideration of their main characteristics rendered the hypothesis of botulism untenable, chiefly because: (1) Instances occurred where no preserved or tinned foods had been partaken of; and (2) No series of cases were reported in which more than one member of a family was affected.

As a fact, cases in every way identical had occurred in epidemic form in Vienna and its neighbourhood in the earlier months of 1917, but had received little attention in this country. Further, in the first half of 1918, cases precisely similar were being observed in Paris and reported in detail by M. Netter under the title 'encéphalite léthargique épidémique.'

There is no doubt now that the condition is one of toxic or toxi-infective invasion of the grey matter of the brain, and perhaps also, in certain instances, of the cord, by some at present unrecognized agent, presumably of a microbial nature, perhaps a 'filter passer.' It is true that in the Viennese epidemic von Wiesner was able to cultivate a diplo-streptococcus from the brain of a monkey injected subdurally with a brain-cord emulsion from a fatal human case, the animal dying forty-six hours after the injection. Curiously, however, this organism is not mentioned as having been seen microscopically in the patient's tissues or as having been grown directly from them. The problem, therefore, appears to be one of an organism as definite as a diplo-streptococcus, not recognizable in the tissues, not culturable directly from them, but capable of being transmitted—hypothetically in some other form—via an experimental

monkey, and of developing in its tissues as a diplo-streptococcus. Whether such a pleomorphic organism really exists is matter for further investigation.

As far as the English cases are concerned, minute examination of my own material proved negative, and this has been the experience of others, and of Netter in Paris.

Epidemic encephalitis is an acute nervous disease characterized by both general and localizing symptoms; in a minority of cases the latter are not prominent. The sexes are affected indifferently, and there is no special age-incidence. A series of cases occurring in children was reported by Batten and Still. Of thirteen cases under my own observation, all but two were in adults.

The onset is acute, and sometimes fulminant; occasionally, in mild cases, it is somewhat insidious.

SYMPTOMS.—Of the *general symptoms*, apathy, lethargy, absence of initiative or spontaneity, drowsiness, pathological sleepiness, actual stupor—one or other is prominent usually from the beginning, and is in any case probably the most striking feature. Hence the (grammatically illegitimate) expression 'lethargic encephalitis' used by some to designate the disease.

Preceding or alternating with this profound indifference or hebétude, a degree of restlessness or of restless delirium is often to be noted, with frequent automatic reproduction of purposeful movements in an utterly purposeless fashion. Such movements are sometimes occupational in type, and their occurrence is of considerable scientific interest.

Catatonia or *flexibilitas cerea* is a common symptom. Delusions and hallucinations, as in any toxic psychosis, may occur. It is a remarkable fact, however, on which nearly all observers agree, that even at the height of the illness the patient's response to requests is unexpectedly accurate and rational, and that he can be roused out of his stupor to give this response—a feature of the disease worthy of special attention.

Incontinence may be the outcome of the psychical clouding; headache, vertigo, and vomiting may be present. The temperature is often more or less normal throughout; a moderate rise at the outset or subsequently may be noted; in fatal cases it may increase progressively and irregularly.

Meningeal symptoms and signs may be observed to a greater or less extent in a minority of cases.

Of the *localizing symptoms*, unquestionably the commonest grouping is of the polio-encephalitis-superior type—that is, a peri-aqueductal grouping. Hence, symptoms referable to the intrinsic and extrinsic ocular muscles are almost constant—paralysis of accommodation, diplopia, any degree of ophthalmoplegia externa or interna, or both, with or without ptosis. (*Plate XIV, B, C.*) These may be the earliest signs, and the last to disappear.

Involvement of lower cranial nerves is the next common type of nuclear invasion; hence, an expressionless and paresed or paralyzed facial musculature; also paresis or paralysis in varying degree of palate, tongue, larynx, or pharynx.

The predilection for motor as opposed to sensory cranial nerve nuclei points to specificity of action of the postulated virus of the disease, and is probably of diagnostic significance.

More rarely are the limbs involved, from implication of corticospinal paths. Theoretically, no doubt, any area whatever of grey matter may be affected, but unquestionably motor symptoms predominate over sensory; the latter are rare, and as it were accidental. I have seen two cases of regio-subthalamica localization, with a close clinical resemblance to paralysis agitans. Others have described cases in which involuntary movements of a choreic nature were noted, also suggesting a basal origin.

There is no characteristic change in the reflexes, cutaneous or deep.

The cerebrospinal fluid has been subjected to minute analysis by nearly all who have been working on the subject. In the great majority of cases it is normal, chemically and microscopically; pleocytosis is rare, and when present is moderate in degree, and not specially lymphocytic in type; in cases with meningeal symptoms the fluid may be definitely pleocytic.

PROGNOSIS.—The disease may end fatally in a few days from the onset, or it may be prolonged for weeks and months. Economo's figures (Vienna) for the ratio of mortality are 6 cases out of 11; Netter's (Paris), 7 out of 15; my own, 2 out of 13.

MORBID ANATOMY.—The pathological signs, as based on my examination of two fatal cases, are those of a hæmorrhagic encephalitis. Scattered irregularly through grey and white matter are minute hæmorrhagic foci, usually discrete, but occasionally massed in a confluent fashion, and perhaps more widespread in the mesencephalon generally than elsewhere. (*Plate XIV, A.*) Sometimes to the naked eye the appearances are merely those of general congestion or hyperæmia. Microscopically, there is commonly a degree of patchy diffuse meningitis with scattered cellular exudates. Lymphocytes, polymorphonuclear leucocytes, and plasma cells are all to be seen. As for the cerebral substance itself, the grey matter generally is the seat of obvious perivascular cellular infiltration, especially round the veins, of the same mixed type as already described. Minute collections of mixed cells may be seen scattered through the grey matter, apparently independent of vessels. Compound granular corpuscles may be discovered in patches round the older hæmorrhagic foci.

In addition to these interstitial changes, parenchymatous alterations in the shape of nerve-cell degeneration, acute or subacute, and actual neuronophagia, may be seen here and there. Nerve fibres are unaffected directly as a rule, but may, of course, show secondary alterations. Minor changes of the above general nature may be found in the cord.

NATURE OF THE DISEASE.—Clinical and pathological evidence points clearly to the condition being one of encephalitis, which one has every reason to presume to be toxic or toxi-infective in origin. In all the reported cases the cerebrospinal fluid has been bacteriologically negative, while both ordinary and anaerobic cultures have proved sterile. Reference has already been made to the question of the diplo-streptococcus of the Viennese epidemic, and to difficulties in the way of accepting it.

It has been maintained that the disease is simply an aberrant or unusual type of epidemic poliomyelitis, or, preferably, polio-encephalo-myelitis. Needless to say, there are obvious and close resemblances between the two classes of case.

On the other hand, several considerations point strongly in the direction of a distinct, non-poliomyelitic virus for this epidemic disease. Prominent among these are the insignificant and minor changes in the cerebrospinal fluid. In a recent paper Dr. Vaidya has amply corroborated this contention, concluding from the examination of a large number of cases under his observation at the London Hospital that in the fluid "the deviation from the normal is very small." This is certainly contrary to the usual experience in cases of ordinary poliomyelitis.

In brief, the evidence now available suggests that in this epidemic we have been dealing with a form of infection akin, no doubt, to the virus of poliomyelitis, but not identical with it—a form of infection which has a special tendency to involve the oculomotor nuclei, and the dissemination of which through the brain is associated with the special clinical symptom of lethargy or stupor.

PLATE XIV.

EPIDEMIC ENCEPHALITIS

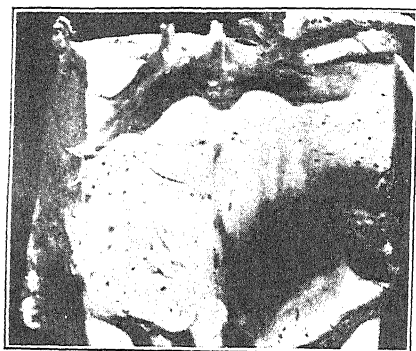


Fig. A.—Section through the mesencephalon. Confluent haemorrhages on the right, and punctate haemorrhages scattered elsewhere in the grey and white matter.



Fig. B.—Facies showing double ptosis, external strabismus, mask-like face, obliteration of facial lines.



Fig. C.—Facies showing double ptosis, as in sleep; expressionless face; mouth half open, as from loss of tone in the orbicularis oris.

S. A. Kinnier Wilson, M.D.

It is by no means clear that we are dealing with a 'new' disease. Sleepiness, lethargy, or stupor may well accompany any form of encephalitis. Symptoms analogous to those under review may occur in any form of encephalitis, e.g., that associated with influenza. Cases closely resembling those of this epidemic have been noted as occurring sporadically in previous years. Further research will, it may be hoped, determine the question of the specificity or otherwise of the postulated virus, and thus clear up much that is still vague in the whole subject of encephalitis.

TREATMENT.—Until this hope is realized, treatment must remain empirical and expectant, and can be conducted only on general lines.

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ENDORRHINOSCOPY.

P. Watson-Williams, M.D.

The examination of the nasal passages by inspection is usually confined to anterior and posterior rhinoscopy; and the regions that can be thus examined are restricted and often most unsatisfactory. But by the use of a small periscopic lens on the principle of the cystoscope, we are now enabled to inspect successively the greater portion of the nasal passages, thereby bringing clearly into the visual field not only parts of these passages otherwise inaccessible, but also minuter details than could be identified by the older methods.

Various instruments have been utilized for endorhinology, but in this brief note it will suffice to state that Holmes's modification of Valentin's instrument was employed in the series of cases illustrated and demonstrated by the writer at the Royal Society of Medicine* on Nov. 2, 1917, and from which a few selected examples are taken.

The instrument is best introduced under inspection with the help of a nasal speculum passed gently along the floor of the nasal passage, after previous spraying with cocaine solution sufficient to render the mucous membrane partially insensitised and also to cause some shrinking of the turbinates. It is usually most convenient to pass the instrument right back to the posterior wall of the nasopharynx before making any inspection, and with the lens uppermost (*Fig. 52*). The light is then switched on, and the eye applied to the proximal end. Slightly rotating the instrument, one catches sight of the posterior border of the vomer, and as the rhinoscope is turned and rotated and withdrawn, it is easy to 'remember one's way' and piece together the pictures successively coming under the eye—one sees the Eustachian tubes, fossæ of Rosenmüller, the roof of the nasopharynx, and the upper surface of the soft palate. More anteriorly one recognizes the posterior ends of the inferior turbinate bodies, the posterior border of the middle and often of the superior turbinates, etc. While, of course, the outline is of importance, and the revelation of tumefactions, polypus, and purulent discharges; of hardly less value in many conditions are the colour, pallor or congestion, swollen vessels, etc.

As one draws the instrument slowly forward, the middle meatus, olfactory fissure, the middle turbinal lower border, etc., successively come into view,

* *Proc. Roy. Soc. Med.* xii, No. 3, p. 50.

and it is often possible to see the lower end of an opened frontonasal duct, or a minute polypus in the region of the fronto-ethmoidal cells which it is quite impossible to distinguish at all by anterior rhinoscopy. Without attempting to indicate all the valuable purposes subserved by endorhinoscopic inspection, the few examples illustrated here will suffice to demonstrate some of the important diagnostic points that other methods of examination cannot afford, at any rate with equal clearness.

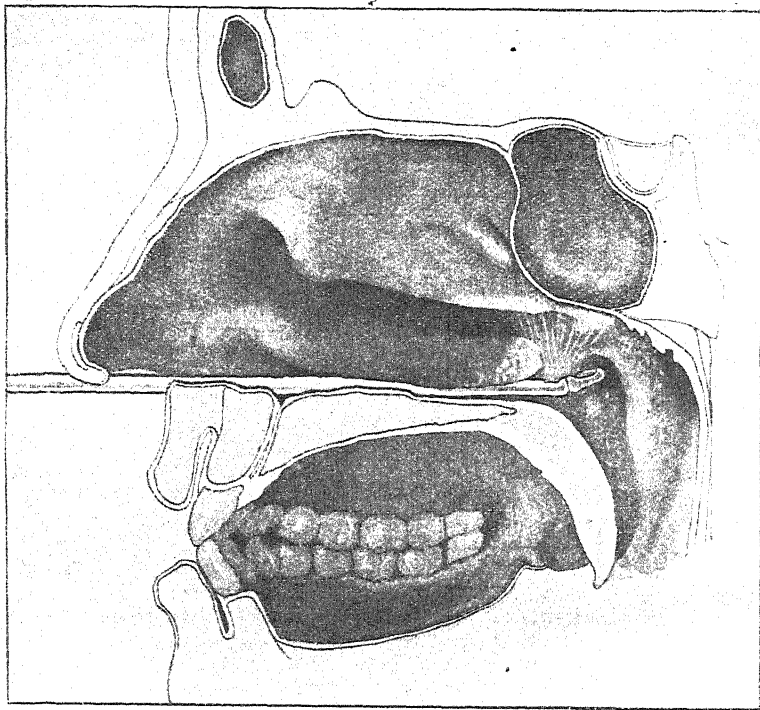


Fig. 52.—The endorhinoscope has been passed along the floor of the right nasal passage until the lamp has reached as far as the Eustachian opening. The brightly illuminated posterior end of the inferior turbinal and lower border of the posterior third of the middle turbinal show the parts that strike the inspecting eye, while the anterior and posterior lips of the Eustachian tube would not come into clear view until the instrument was rotated so as to make the small prism face these parts.

(From drawing by Miss Marjorie Watson-Williams.)

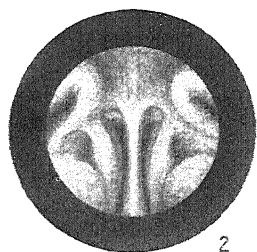
EXPLANATION OF PLATES XV-XVIII.

Note.—The illustrations being reflections, the *Right* and *Left* sides are reversed.

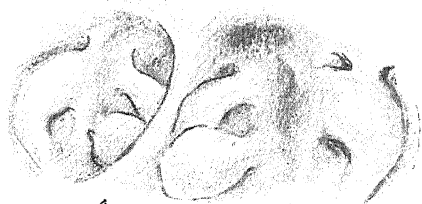
2.—Shows the views obtained by inspection alternately through the right and left passages, the two images being combined in one picture. Note that the Eustachian tubes seem too high; they are just caught in the view with the endorhinoscope looking upwards as in *Fig. 52*. The central straight dividing partition is the posterior border of the vomer.

3.—A view of the patient's right Eustachian tube as seen by the instrument passed through the left nasal passage and turned to look across to the right when the prism

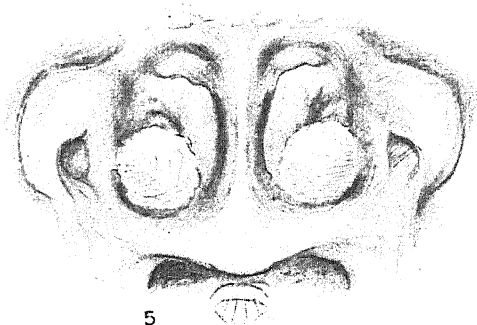
PLATE XV.
ENDORRHINOSCOPY



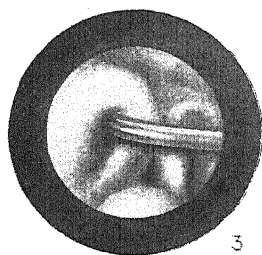
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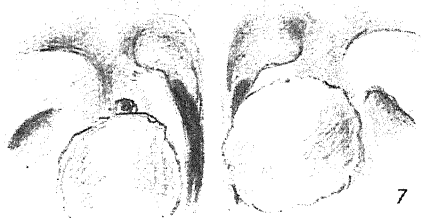
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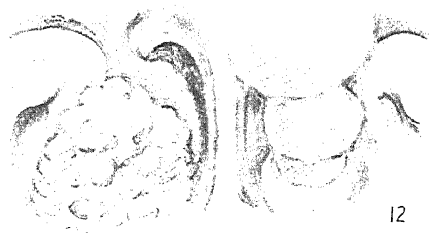
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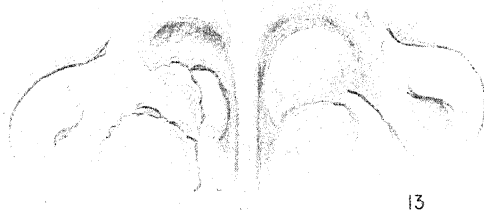
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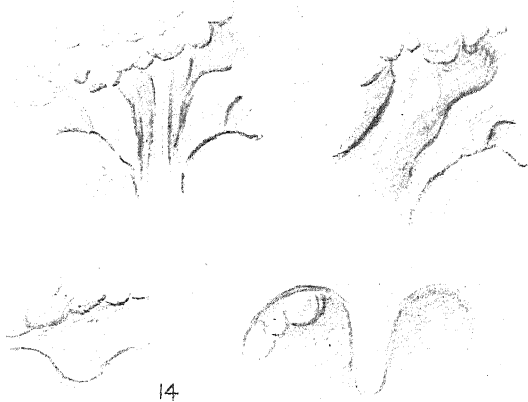
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PLATE XVII.

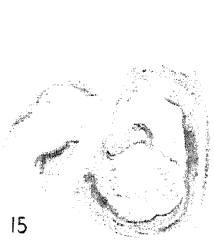
ENDORRHINOSCOPY—continued



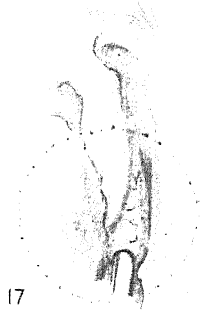
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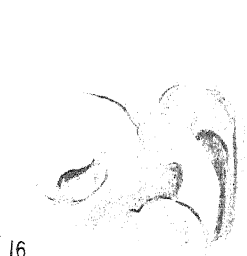
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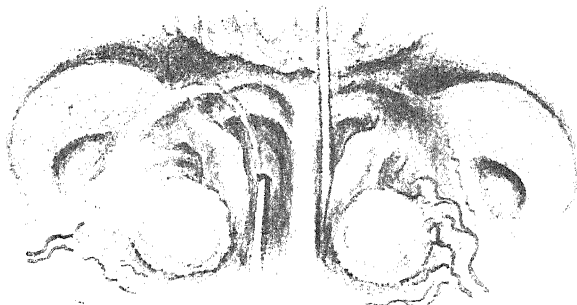
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PLATE XVIII.

ENDORHINOSCOPY--continued



has passed well behind the posterior border of the nasal septum. A Eustachian catheter has been passed into the right Eustachian tube, and one can see that it has been correctly introduced. This illustrates one of the uses of endorhinoscopy.

4.—Inspection of the choanae narium of both sides through the left nasal passage. The prism has been carried back into the nasopharynx, showing as usual the posterior ends of the left middle and inferior turbinates. By rotating it outwards, the patient's left Eustachian tube has been brought into view, and by rotating it to the patient's right one looks across the posterior border of the vomerine septum nasi so as to see the patient's right Eustachian tube; one can also see in part the right middle and inferior turbinates of that side. Observe the absence of any discharges in the olfactory fissure and in the middle or inferior meatus. It is noteworthy that the prism being closer to the patient's left Eustachian tube and turbinates, they all appear larger than the same structures of the opposite side: this great difference is due to the magnification of the parts that are nearest the prism. In other words, the difference is out of proportion to the actual distance of the view-point in the prism. The views of the parts thus successively brought to the eye are combined into one picture. The only abnormality to be seen is the old adenoid band of adhesion between the posterior lip of the left Eustachian-cushion and the posterior nasopharyngeal wall, stretching across the fossa of Rosenmüller.

5.—A complete composite picture of the endoscopic views of the nasopharynx of an adult male, obtained by successively rotating the endoscope to look upwards, to the right and left, and finally directed downwards so as to view the larynx, which being far away, yields a diminutive image of little value. On the nasopharyngeal roof are seen small remains of the atrophied nasopharyngeal tonsil. The band formed by the salpingo-palatine muscle is more marked than usual, and the appearance in the drawing suggests discharge coming from the Eustachian tubes, though in natural colours the absence of any discharge was clear. The advantage of being able to bring all these parts under a much closer and more direct inspection than anterior or posterior rhinoscopy can possibly afford hardly needs to be emphasized.

6.—A normal composite view of both choanae, but including the indication of normal venules. The marked increase in the size of the vessels, and the appearance of several minute vessels in the mucosa in situations where these are normally absent, may constitute valuable evidence of an inflammatory turgescence when mucopurulent discharges may have been temporarily sniffed or drained away at the moment of inspection.

7.—Hypertrophic posterior ends of the inferior turbinates in an otherwise normal view. The enlarged turbinates partly obscure the anterior lips of the Eustachian tubes, and those on the patient's left side also overlap the vomerine border.

8.—On the right side are strings of muco-pus extending from the posterior inferior border of the middle turbinate, and other bands of sticky muco-pus drop down to the posterior end of the inferior turbinate. But the small stream of muco-pus coming from beneath the middle turbinal and oozing back over the inferior turbinal is of greater significance, and points to a right antral-sinus infection; and on the left side the same remarks apply. Note that the upper area of the choanae narium and the olfactory fissure on either side, i.e., the area for secretions from the sphenoidal sinus, are free from muco-pus. The patient had double antral sinusitis.

9.—Patient with left sphenoidal-sinus suppuration. A streak of muco-pus extends from the posterior vomerine border up to the small atrophic adenoid mass in the roof of the nasopharynx. The important diagnostic feature is the stream of muco-pus coming from above the posterior border of the left middle turbinal, i.e., from the left olfactory fissure, and streaming down over the posterior end of the inferior turbinal. With such a collection of bubbly secretion in this region it was not possible to exclude a left antral suppuration until other observations were made subsequently, but the existence of sphenoidal sinusitis was proved at the operation.

10.—On the patient's left side one sees many strings of muco-pus spreading between the posterior end of the inferior turbinate and the septal border and Eustachian tube; but the small stream coming from beneath the left middle turbinate and spreading back over the inferior turbinate is the significant feature, as it suggests that the discharges come from the left maxillary antrum, while the rest only tends to obscure this.

11.—Streak of pus oozing from the right Eustachian orifice, and emptying into a bubbly mass of muco-pus behind the inferior turbinate. Other such strings are seen. A streak of muco-pus passes on to the back of the vomer, and from the vomer another streak passes to the roof of the left choana, but are of no diagnostic value.

12.—Shows a choanal polypus and moriform turbinal hypertrophy. On the right side there is a well-marked moriform hypertrophy of the posterior end of the inferior turbinate, which therefore extends backwards behind and partly overlaps the

Eustachian tube. The middle turbinal shows unevenness of the mucosal surface due to slight polypoid thickening. No secretion is seen in the passage, as it was washed away before the drawing was made. On the left side the middle turbinate and most of the inferior are concealed by the polypi, one large one in the nasopharynx and two smaller in the middle meatal region.

13.—Maxillary, antral, and sphenoidal sinusitis, and polypus nasi. On the right side one sees a crenated thickening of the posterior end of the middle turbinal and, issuing above it, a stream of thick muco-pus which trickles down to the posterior end of the inferior turbinal. On the left side the 'sphenoidal-sinus region' is occluded from view by a mucous polypus, and, escaping beneath this, i.e., passing backwards from the left middle meatus, is a stream of muco-pus which spreads over the inferior turbinal, the discharge coming from the left antrum.

14.—Sarcoma of the nasopharynx. Below are shown the appearance of the lower margin of the growth on the right side below the level of the velum palati, and on the left the aspect presented by posterior rhinoscopy. Above to the right is the appearance on endorhinoscopy through the left nasal passage, and the largest picture is the drawing of the endorhinoscopic view through both nasal passages combined in the usual composite picture.

15.—A cyst on the upper margin of the right Eustachian cushion.

16.—The right Eustachian tube in deglutition.

17.—A probe shown entering the right frontal sinus. To get a view of the frontal sinus ostium the endorhinoscope has been drawn forwards. The part usually brought into view with the instrument in the nasopharynx is drawn above, and the appearance presented by the structures as the instrument is drawn slowly forward is shown below. The dotted circle shows the approximate visual field whilst the frontal-sinus ostium is in view.

18.—A patient suffering from right sphenoidal and antral suppuration. On the right side is seen a double streak of pus coming from the middle meatus between the posterior end of the inferior turbinals and forming a blob of thick muco-pus on the latter. A probe is shown entering the sphenoidal sinus ostium and, extending upwards (in the picture) from the sphenoidal ostium, is a thin streak of pus oozing above the middle turbinate to reach the cushion of the right Eustachian tube. On the left side there is no muco-pus, but a probe has been passed backwards so as to impinge on the small mass of atrophied adenoids. This picture is also useful as showing the apparent direction of a probe which is passing almost directly backwards.

Macleod Yearsley,¹ in a contribution on the value of endorhinoscopic examination, illustrates many conditions in which the method affords information which it is impossible to obtain by any other method of inspection.

REFERENCE.—¹*Jour. Laryngol.* 1918, Jan., 4.

ENURESIS IN CHILDREN.

Frederick Langnead, M.D., F.R.C.P.

TREATMENT.—Emerson¹ records a series of thirty-four cases which recovered without the use of drugs. The treatment consists of four methods, one or all of which may be used in a given case. The 'dry habit' once inaugurated must then be continued by careful oversight. (1) **Mental Suggestion**; (2) **Establishing the 'Dry Habit'** by teaching the reflex to act at regular intervals, and always before the incontinence occurs; (3) **Local Irritation** by irritating the vesicular sphincter and the posterior urethra by means of a bougie-à-boule, so that sensory impulses passing to the brain will become intensified sufficiently to attract the patient's attention, until the habit of control is attained; (4) **Cerebrospinal Irritation** is produced by the injection into the spinal canal of physiological salt solution, producing such stimulation as to arouse the whole mechanism into consciousness, when habit holds it under control. [The last two methods are certainly drastic and open to the objection that they are inseparable from pain, which is hardly warranted by the seriousness of the condition. It can certainly be argued that the remedy is worse than the disease, especially in view of the truth that nearly every case recovers at puberty, and that till then its troublesome but not serious effects may be guarded against by a mackintosh sheet. Clearly the writer, too, is only dealing with cases in which there is no organic lesion or mental feebleness.—F. L.]

REFERENCE.—¹Quoted in *Jour. Amer. Med. Assoc.* 1918, i, 1566.

EPIDIDYMIS, DISEASES OF. *J. W. Thomson Walker, M.B., F.R.C.S.*

Vivian¹ advocates radical treatment of gonorrhoeal epididymitis complicated by peri-epididymitis. The epididymis is exposed and fully punctured with a blunt probe, and silkworm-gut sutures are inserted for drainage for forty-eight hours. Pain is relieved, and the patients leave the hospital in ten days.

Cook² is a strong advocate of surgical treatment of epididymitis. The testicle and epididymis are exposed by incision, and the globus minor is punctured with a cataract knife, the opening being enlarged and drained if pus appears. The results have been so uniformly good, and the recoveries so rapid, that the author believes the operation should be done in all cases.

Lepinasse³ writes on *obstructive sterility* in the male and its treatment by vaso-epididymostomy (Martin's operation). The condition is diagnosed by the absence of spermatozoa, and the operation necessary depends upon the site of obstruction; the author gives the following list: (1) If the obstruction is in the epididymis, the operation will be direct vaso-epididymostomy; (2) In the scrotal vas, resection of the obstruction and union of the vas, either end-to-end or lateral; (3) In the pelvic vas or ejaculatory duct, author's sac operation; (4) In the pelvic vas on one side and epididymis or scrotal vas on the other, anastomosis of the vas on one side with the vas on the other above the site of obstruction. Lepinasse argues that Martin's operation as at present practised fails owing to stricture of the epididymis tubule, or organizing of blood-clots on the cut surface of the epididymis, obstruction of the tubule resulting. To obviate this the following technique is recommended: "The vas is exposed and incised longitudinally, and a tubule of the epididymis exposed. A suture of fine silk is passed longitudinally through the wall of the epididymis tubule down the lumen and out again through the wall of the tubule 2 to 4 mm. from the point of entrance. The ends of this crown or epididymal stitch are passed through the longitudinal incision along the lumen of the vas, one upwards and the other downwards, and out through the wall of the vas again. After introducing lateral fixation stitches and replacing the testicle, each end of the crown or epididymal thread is passed through the scrotum from within outwards." In from one to two weeks, when a necrosis of the wall of the epididymis tubule which has been in the grasp of the suture has taken place, this suture can be removed by slow gradual traction.

The author states that the operation was successful in 10 out of 11 experiments on dogs, and in 1 case in the human subject.

REFERENCES.—¹*Ann. Surg.* 1918, Jan., 108; ²*Jour. Amer. Med. Assoc.* 1918, April 6, 981; ³*Jour. Amer. Med. Assoc.* 1918, Feb. 16, 448.

EPILEPSY.

J. Ramsay Hunt, M.D.

There is no disease which has a more ancient or more interesting history than epilepsy. In many respects, notwithstanding centuries of study and observation, it remains a mystery still. Especially is this true of the origin and fundamental nature of the disorder. It is readily understood, therefore, why in this disease each new advance or fad in medicine leaves its imprint on the history of the epilepsies. With the advent of endocrinology, there has been much speculation as to the 'ductless gland' origin of this disorder. Then there are the minor outbursts of recent years, e.g., the 'crotalin treatment,' and the infectious origin of the disease, the so-called *Bacillus epilepticus*; but the mystery is still unsolved. We are now living in an era of psychic analysis and intensive study of the personality in health and disease, and it is therefore not surprising to find epilepsy drawn into this field, as it has been into so many others, in the effort to solve the problem.

Clark¹ has made a series of studies from the psycho-analytic standpoint

which is suggestive and interesting. Even if the conclusions drawn are premature and incorrect, the increased knowledge of personality in relation to the disease is of importance both clinically and in the management of the affection.

From time immemorial, he says, the idiopathic epileptic has been considered a peculiar type of individual. The salient features of the personality to be found in individuals possessing such a defective primary endowment are *ego-centricity*, *supersensitiveness*, marked *emotional poverty*, and *rigidity*. For years this character type has been supposed to exist as a direct result of the epileptic seizures. It has also been assumed that the amount of make-up the individual possesses goes hand-in-hand with the length of time the epileptic has had his disease, together with the severity and frequency of attacks. However, a number of clinicians thought this latter statement was not necessarily true, and believe that the character develops *pari passu* with the convulsive part of the disorder, and that they are not essentially in the relation of cause and effect.

Clark has studied the character make-up in a small series of essential epileptics before they had their first attack, and found these potential epileptic individuals had nothing wanting in the complete picture of the character as seen in those suffering from a long-enduring and severe epilepsy, though many times the character faults were not so glaring as in the frank epileptic; there was also a wide latitude in the quality and amount of defect encountered. It is becoming more and more evident to epileptologists that not only are the detection and careful delineation of character of chief moment in the final diagnosis of essential epilepsy, but prognosis and treatment must largely rest upon such data.

He states that while there are many important phases of the physical and mental make-up of the epileptic constitution to be made clear, we should continue to study all the mental factors, both immediate and remote, which appear to initiate attacks in epilepsy. With this end in view he has studied the mental content of the automatic and delirious phases of the epileptic seizure, both *grand mal* and *petit mal*, and believes that important relations with the unconscious life of the epileptic may be established. Some critics have stated that these studies are but attempts to make the epileptic fit a neurotic episode capable of analysis. To this he states that nothing is further from his purpose. He firmly believes that the epileptic disorder is specifically and definitely conditioned upon an organic basis, but this should not deter us from using every psychological method at hand to understand the instinctive defects of make-up of the epileptic and the mechanism of his attacks. The practical and therapeutic advantages of such studies are the same as one may obtain for the understanding of the deepest conflicts of manic-depressive and dementia-præcox individuals by a knowledge of their inherent defects of make-up, and thus be able to utilize the fact in helping such individuals to make better personal and social adaptations. From such data one may often fashion therapeutic talks of greatest benefit.

We know that the sleep stage after the *grand mal* convulsion is often deep and profound, and that it represents physiopathologically a cloak, as it were, for the individual epileptic under which he recovers from the physical and mental exhaustion entailed by his seizure. However, if one chooses for the purpose of study to awaken or greatly arouse the epileptic a short time after the most profound post-convulsive sleep has passed, one may by intensive inquiry obtain a mental content which is comparable to that spontaneously produced by others or by the same patient following his milder attacks. The material thus obtained is probably from a deeper level of conscious strivings. Indeed, he believes one may often obtain by early questionings in these more diffused and more slowly elaborated convulsive fits the original mental content

of annoyance or stress away from which the individual patient seems to be reacting.

It would seem, therefore, as though in many individuals suffering from essential or idiopathic epilepsy, there is a peculiar type of make-up antedating the disorder, and that the frank epileptic attacks are but a more pronounced manifestation of this character make-up. The attacks are often induced by certain and varied types of stress, exogenous as well as endogenous, but the former have not been given the attention their importance demands. The mental content immediately after the convulsive part of the fit, either spontaneous or brought out by questioning, gives us data highly important for studying the unconscious strivings as well as the patient's construction of the way by which he thinks he may overcome his malady.

This brief and fragmentary study of the mental content of definite though mild reaction episodes in a few epileptic cases shows that the work is enormously complicated, as varying depths of consciousness may be tapped, as it were, even in the one patient and in the one attack. As our psychoanalytic knowledge of the dream problem as well as of the mental content of many of the psychoses grows, the field sketched here will, he believes, be found more necessary for scientific and therapeutic study.

Clark even considers the personality factor in the organic epilepsies, and states that although the epilepsy is based on an organic lesion, the sequential epilepsy takes on the development not essentially different from that of genuine idiopathic epilepsy. Instead of postulating that essential epilepsy is probably organic because it is akin to symptomatic epilepsy in its manifestations, he states one might bring forward data to substantiate the reverse view, that the epilepsy develops even in the infantile hemiplegias as a result of certain character and stress defects superimposed on a stationary lesion. We know that only about half such patients become epileptic in later life, and those, too, who are most unstable and poorly developed to meet the stresses of life. He would therefore regard both organic and functional epilepsy to be the result of a personality reaction to inward stress.

REFERENCES.—¹N. Y. *Med. Jour.*, 1918, 817, and 1917, 677; *Jour. Amer. Med. Assoc.* 1918, 357 and 255.

ERYSIPELAS OF THE NEW BORN.

Serum treatment (p. 7).

ERYTHEMA FIGURATUM PERSTANS. *E. Graham Little, M.D., F.R.C.P.*

Mook¹ describes two cases, obviously of the same type of disease, in which the characteristic feature was the appearance of a circinate erythematous lesion spreading from an initial small red 'spot,' forming rings 4 in. or more in diameter, fading after three or four weeks, leaving a brownish discoloration, and some scaling, but otherwise disappearing without trace. The disease was extremely chronic, the duration in these two cases being respectively twelve years and ten years, during which the patients had never been entirely free of eruption. In both cases a beef anaphylaxis was suggested, but strict vegetarianism for six weeks produced no improvement in the second case. No treatment seemed to produce permanent benefit.

REFERENCE.—¹*Jour. Cutan. Dis.* 1917, Oct., 635.

ERYTHEMA NODOSUM.

E. Graham Little, M.D., F.R.C.P.

Marfan¹ considers the tuberculous causation of erythema nodosum as proved. "Erythema nodosum only occurs in tuberculous subjects, usually in those in whom the infection is still latent. It is the outward and visible manifestation of slight, septicæmic, attenuated, curable tuberculosis, but is

assuredly of bacillary origin." The treatment of the acute phase will be that of any acute superficial tuberculous affection, e.g., pleurisy. As there is some fever, Salicylate of Soda is useful. The patient should be confined to bed as long as the temperature remains above 99.5° , and he should be given 40-cgrm. doses of the salicylate three times a day. His diet should consist of milk, soups, beef tea, purées, farinaceous articles, cooked fruit, and milk. As soon as the fever has subsided, plenty of meat and eggs should be given.

REFERENCE.—¹*Med. Press and Circ.* 1918, July 3, 6.

EXOPHTHALMIC GOITRE.

X-ray treatment (*p.* 41).

EYE AFFECTIONS. (*See also* VISION, DISTURBANCES OF.)

R. Foster Moore, F.R.C.S.

The Action of Miotic Drugs on Eyes with Incomplete Sphincter Iridis.—R. J. Curdy¹ gives extracts from ten writers to show the contradictory views as to the effects of miotic and mydriatic drugs in cases where there is a solution of continuity of the sphincter iridis, whether as a result of operation or trauma. He shows, in three cases of iridectomized eyes, that **Physostigmine** has a marked action in reducing the size of the coloboma, that it may produce reduction of tension in a glaucomatous eye, and that the symptoms often seen after the use of a miotic still occur. He states that the conflicting opinions with regard to action of miotics in these cases are based mainly on theoretical considerations, and he concludes that neither miotics nor mydriatics have any power to increase or diminish the extent of iris tears.

Local Anæsthesia for Operations on Eyes.—O. Haab² recommends the use of the subconjunctival injection of two drops of 10 per cent **Cocaine** as an anæsthetic for operations for glaucoma, and has used it for the removal of a magnetic intra-ocular foreign body.

Chloramine as an Antiseptic in Ophthalmology.—F. de Lapersonne³ experimented at first with solutions of pure hypochlorite of soda, but discarded this salt as being productive of too great pain and reaction. He next used **Chloramine**, which, in contact with the tissues, slowly produces hypochlorite of soda. This can be used either in the form of drops or as an ointment. The strength used as drops is from 1 to 4 per cent; slight pain and reaction results from the stronger solutions. As an ointment it should be of a strength of 1 or 2 per cent, using a gelatin base. The author states that chloramine is a powerful antiseptic which is tolerated perfectly by the conjunctiva, and that it appears to be of particular value in ulcerations of the cornea.

Mesothorium Treatment of Eye Diseases.—N. J. Cuperus⁴ considers that treatment by **Mesothorium** or **Radium** is useful in a number of conditions, e.g., blepharitis, and chronic inflammations of the conjunctiva, cornea, iris, or vitreous—where other remedies have failed. Koellner⁵ reports a case of epithelial new formation of the corneal limbus which had been present for five years and which was cured by mesothorium.

Hypopituitarism and Glandular Treatment.—C. A. Elsberg and E. F. Krug⁶ publish what appears to be a strikingly successful case of hypopituitarism with homonymous hemianopsia relieved by **Glandular Treatment**; they suggest that whilst the surgical treatment of hypophyseal tumours is so unsatisfactory, all such cases should be treated by glandular extract.

G. de Schweinitz and H. W. How⁷ point out that gland therapy is only indicated where there is hypopituitarism, and that since other ductless glands may be involved, notably the thyroid, extracts of these other glands should be administered at the same time.

An Ocular Therapeutic Lamp.—Edgar J. George and Julius A. Toren⁸ describe a 50-watt Electric Light with a violet glass globe designed for the treatment of corneal ulcers, iritis, episcleritis, and ciliary neuralgia. A temperature of 170° at the cornea was found to be the most effective. It is stated that the thermal death-point for the staphylococcus is 149° for fifteen minutes, 158° for ten minutes, and 176° for five minutes, and so on for other organisms.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1918, i, 1992; ²*Corresp.-Blatt. f. Schweizer Aerzte*, 1918, May 11 (abstr. *Jour. Amer. Med. Assoc.* 1918, ii, 74); ³*Presse Méd.* 1917, Jan. 31, 53; ⁴*Arch. of Ophth.* xlvii, No. 2, 126; ⁵*Ibid.* 130; ⁶*Arch. of Ophth.* xlvii, No. 2, 97; ⁷*Ibid.* 139; ⁸*Ophth. Rec.* 1917, May.

EYE DISEASE, NASAL ACCESSORY SINUSES IN RELATION TO. (*See* NASAL ACCESSORY SINUSES IN RELATION TO EYE DISEASE.)

EYE DISEASES, ANAPHYLAXIS IN RELATION TO.

R. Foster Moore, F.R.C.S.

Schieck¹ considers interstitial keratitis as a possible anaphylactic manifestation rather than a direct result of the presence of toxins acting upon the cornea.

Von Szily,² in a paper, entitled, "Thoughts and Experiments on the Rôle of Anaphylaxis in Ocular Inflammation," concludes that: (1) Local anaphylactic inflammations of the eye have undoubtedly great theoretical and practical significance in human pathology; (2) The requisite conditions for the production of an irritant anaphylactic poison are frequently present in the course of various eye affections; (3) It is at present impossible to regard anaphylactic processes as the primary cause of definite types of eye disease; (4) The assumption of the existence of primarily active toxins for the production of anaphylaxis is necessary for the full recognition of the significance of anaphylactic processes in human pathology; (5) The theory that the specific or non-specific inflammatory sensitization of one eye increases the sensitivity of the other has no experimental basis; (6) The importance of anaphylactic processes in ophthalmology consists in the possibility they offer of a new explanation of inflammatory conditions in the eye which are not adequately explained by the direct action of local micro-organisms and their toxins.

Trubin³ deals with the production of local anaphylaxis in the eyes of rabbits. The rabbits were sensitized by the intravenous injection of ox or sheep vitreous twenty to twenty-five days before the injection of the antigen either into the vitreous, anterior chamber, or substance of the cornea. By this means he was able to produce definite anaphylactic changes, especially if the antigen was injected into the vitreous. Degeneration of the retina and choroid ensued, which was not due to infective endophthalmitis. The results of the experiments lend no support to Elschnig's theory. The differences between these processes and sympathetic ophthalmia consist mainly in the absence of any symptom of plastic uveitis.

Alan C. Woods⁴ experimented on dogs with a view to discovering whether anaphylactic phenomena could be elicited by antigen carried to the eye by the blood-stream in animals previously sensitized by intraperitoneal infection. He found that these phenomena could be so elicited, and he describes them as consisting in a primary contraction of the pupil, followed by a further gradual contraction, and the production of small extravasations of blood throughout the vitreous. He states that the contraction of the pupil seems to be due to a reaction of the smooth muscle of the iris to the specific antigen in the perfusion fluid, and is in definite accord with the cellular theory of anaphylaxis. In a later paper, Woods⁵ states that "a pigment emulsion has been prepared from the uveal tract which is suitable for use in perfusion. This pigment is a nitrogen-, hydrogen-, carbon-, oxygen-, iron-, sulphur-, and

phosphorus-containing body, and is either a protein or is closely allied to proteins. Perfusion experiments proved that this pigment was the constituent of uveal tissue responsible for its peculiar antigenic properties. The pigment possesses antigenic properties, can act as antigen in the homologous animal, and is organ specific and not species specific."

REFERENCES.—¹*Zeits. f. Augenheilk.* xxxii, s. 96; ²*Klin. Monatsbl. f. Augenheilk.* 1915, liv, 1; ³*Arch. f. Ophth.* 1915, lxxxix, part 2; ⁴*Arch. of Ophth.* 1916, No. 6, Nov.; ⁵*Ibid.* 1917, No. 4, 283. (All abstr. in *Brit. Jour. Ophth.* 1918, Feb., 95.)

EYE, FOREIGN BODIES IN.

R. Foster Moore, F.R.C.S.

At the 1916 session of the Ophthalmological Society of the United Kingdom there was a prolonged discussion which dealt with most of the aspects of this subject, and may be read in the *Transactions*.¹ The discussion may be taken to indicate the general views of British ophthalmologists as regards intra-ocular foreign bodies in civil practice; it is, however, necessarily less authoritative with regard to military practice, for in this case the removal of intra-ocular foreign bodies, where this is possible, is done almost entirely in France, and apparently none of the workers there were able to get over for the discussion.

A Case of Siderosis affecting the Innervation of the Pupil.—Ivor Tuckett² reports the following case. In September, 1916, a tinsmith was observed to have a pupil which was dilated and inactive to light stimulus, whether direct or consensual; he had evidences of siderosis. In February, 1917, Tuckett removed a fragment of iron from the eye at Moorfields by means of the ring magnet. In March the vision was $\frac{6}{6}$ partly, and the pupil was still dilated and inactive. On April 28 the pupil reacted definitely to light all round its circumference. The author deduces that the dilatation of the pupil is due to injury of the endings of the third nerve by means of iron salts, and not to stimulation of the sympathetic fibres. Indeed, the sympathetic nerve endings are impaired by iron salts quite as much as those of the third nerve. The quick recovery of the pupil reaction after removal of the iron is interesting.

The Removal of Steel Particles from the Interior of the Eye by the Magnet.—A paper by Frank Allport³ on this subject is concerned only with civil practice. The author recommends a Victor and a Sweet magnet, and prefers always to try the hand magnet first, and only to use the more powerful Victor if the small one is unsuccessful. Sometimes switching the current on and off will bring forward the foreign body when a continuous pull has failed. With regard to the route to be adopted: (1) If the steel particle is in the lens or anterior to it, the anterior route is used, and as much of the lens as is reasonably possible is washed out at the same time; (2) If the steel is posterior to the lens, it is extracted through the sclera. No attempt is made to sew the sclerotic, for vitreous is almost certain to be expressed in so doing; a conjunctival flap is turned back before incising the sclerotic, and is afterwards sewn over the wound again.

REFERENCES.—¹*Transactions of the Ophthalmological Society of the United Kingdom*, xxxvi, 63-137; ²*Brit. Jour. Ophth.* 1918, Feb., 79; ³*N. Y. Med. Jour.* 1917, ii, 1205.

EYE, PENETRATING WOUNDS OF. (See also OPHTHALMITIS.)

R. Foster Moore, F.R.C.S.

W. T. Lister,¹ in his Hunterian Lecture, deals with many of the lesions of the eyeball produced by war injuries, special attention being given to the theoretical explanation of the effects produced.

Ruptures of the sclerotic are first dealt with. In this connection a rupture which is produced by the impact of a missile does not take place at the point of impact, but at one of two sites according as the fragment is slowly or

rapidly moving. In the former case rupture occurs in the equator round the line of impact, at a point where the globe is least supported. In the case of rapidly moving objects which pass through the orbit without actually touching the globe, rupture is apt to occur at the side opposite the line of transit of the missile. Theoretical considerations are reviewed in detail to explain the different types of rupture of the globe, including those which occur from the entrance of a foreign body into the eye itself or the passage of one through it.

Changes due to concussion in the different parts of the eye are next considered as they affect its different parts. The area that is always concerned is that adjacent to the site of impact. Concussion changes are common in the region of the macula wherever the actual point of contact may be. Concussion changes may also occur by means of *contrecoup* and have a site corresponding with this mode of production. There may be a profound impairment of vision as a result of concussion, but great improvement may occur, and this rapidly.

The changes which occur as a result of infection are considered under the headings of exogenous and metastatic infections, and the manner in which purulent infiltration spreads in the eye is described.

With regard to the changes produced in the vitreous by the passage of a foreign body through it, the lecturer believes that ruptures and fissures are produced in its substance by this means, and that the ruptures so produced determined the course of hæmorrhagic or purulent effusions into the substance of the vitreous.

A drawing of a case was shown in which it was believed that a foreign body had twice rebounded from the surface of the retina before coming to rest. The defects produced in the visual fields when the retina is struck by a foreign body which has penetrated the eye are wedge-shaped, with the apex of the wedge at the point struck. If, however, the damage is in the horizontal plane, the defect of the visual field corresponds with the limited damage to the retina; there is no defect due to damage to nerve fibres running a centrifugal course from the point of injury to their terminations.

Albert Bulson² thinks that an endeavour should be made to save every recently injured eyeball unless it is clear that the eye will be useless. He thinks that an eye should be enucleated if it contains a foreign body which cannot be removed. He considers that a wound behind the ciliary region is comparatively inoffensive.

Detachment of the Retina at the Ora Serrata.—Arnold Lawson³ reports a case in which an officer was wounded in the left eye, an intra-ocular fragment being retained which, after removal of the eye, was attracted by the magnet. Good vision was retained for many months, but about nine months later the eye became irritable and there was sudden loss of vision. This was found to be due to a detachment of the retina at the ora serrata. With the ophthalmoscope a view of the choroid denuded of its overlying retina was obtained. The presence of the foreign body was shown by *x* rays. The eye was removed. A full pathological report by Mr. Treacher Collins is attached.

REFERENCES.—¹*Lancet*, 1918, ii, 67; ²*Jour. Indiana State Med. Assoc.* 1917, Aug. 15. ³*Brit. Jour. of Ophth.* 1917, Oct., 602.

EYE, PHYSIOLOGY OF.

R. Foster Moore, F.R.C.S.

The Blood-pressure in the Eye and its Relation to the Chamber-pressure.—Priestley Smith,¹ continuing his notable work, applies the general principles which he has been able to enunciate as a result of his very thorough and brilliant investigations to a consideration of the pressure in the intra-ocular blood-vessels in particular. The retinal and uveal vascular systems are

separately considered. The arterial entrance pressure, the venous exit pressure and the capillary pressure are dealt with in turn. Reference is first made to the work of von Schulten, who watched the retinal vessels of a rabbit by means of an ophthalmoscope whilst the chamber-pressure was raised to a known degree by means of an injection manometer. The blood-pressure in the opposite carotid was noted at the same time. He found that when the chamber-pressure reached 50 to 60 mm. Hg, the retinal veins were visibly reduced in size but the artery showed no change; the flow through the central retinal and posterior ciliary arteries became intermittent, with a chamber-pressure varying from 90 to 120 mm., the vessels emptying and refilling with the action of the heart—i.e., the diastolic pressure in these arteries was overcome. When the pressure was raised 10 or 20 mm. higher still, the blood-flow was stopped—i.e., the systolic pressure also was now overcome. According to these observations of von Schulten, the diastolic pressure in the retinal artery was about 100 mm., the systolic being 120 mm. Priestley Smith comes to the conclusion that we may reasonably accept Leonard Hill's estimate of 100 mm. as the systolic pressure in the retinal artery.

The exit-pressure in the central retinal vein is next considered. The author first points out that pulsation in the retinal vein on the disc is not uncommon, and this would seem to suggest that the pressure in the vein is but slightly above the chamber-pressure, for this pulsation is produced by the increase of chamber-pressure which results from the systolic influx of blood into the central artery. There are, however, certain difficulties about so simple a deduction, and these are gone into. In the presence of a leaking corneal wound the chamber-pressure is very low, whereas the pressure in the retinal veins is not less than that in the veins of the orbit into which the blood is drained. And again, in cases of glaucoma, where a very high chamber-pressure occurs, the circulation continues and the pressure in the vein must therefore be greater than the very high chamber-pressure in such a case. The author concludes this part of the case thus: "The exit-pressure in the central vein is somewhat higher than that in the chambers of the eye, the difference, probably, being small." And after discussing the question of the chamber-pressure, the author concludes that this may be taken as 24 mm., and that the average exit-pressure in the central vein therefore is not less than 25 mm.

The pressure in the central artery, then, is about 95 mm., whilst that in the vein is about 25 mm. The total fall of pressure in the retinal vessels is thus about 70 mm. How and where is this fall to be apportioned? How much of this fall takes place on the arterial side of the half-way point, and how much on the venous? It is here that Priestley Smith's preliminary investigation renders his opinion so authoritative. The falls in pressure in the two halves of the circuit are proportionate to the resistance encountered, and the ratio of the resistances can be determined from the relative sizes of the arteries and veins, provided—and this he has shown is an important proviso—the two sets of vessels, though differing in size, are alike as to number and manner of distribution. He comes to the conclusion that the cross-section of arteries to veins is as 1 to 2, and he demonstrates by means of microphotographs of the injected retina of the ox (*Plates XIX, XX*) that the arteries and veins in their ultimate ramifications show a general symmetry, and that we shall probably make no great error in computing the relative resistances from the relative cross-sections of the arterial and venous halves of the circuit. The argument then is—the cross-sections are as 1 to 2, the resistances are as 4 to 1; in other words, the fall on the venous side is one-fifth of the total. With a total fall of 70 mm., the venous fall will be 14 mm. Adding this amount to that of the chamber-pressure, we get 25 plus 14, or 39 mm., or the pressure at the half-way point.

PLATE XIX.
THE BLOOD-PRESSURE IN THE EYE
(PRIESTLEY SMITH)

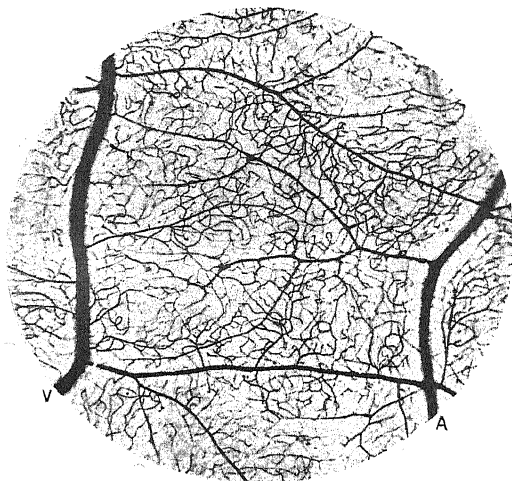


Fig. A.—Retinal vessels of ox injected with carmine-gelatin. V, vein. A, artery. Springing from the artery about half-way up is a branch passing across the picture towards the vein: many of its capillaries cross the vein before reaching the corresponding venules. Springing from the vein are branches passing across towards the artery and beyond it; under the microscope they are easily distinguishable from the artery at the points of crossing. $\times 30$ diam.

(From a preparation and photograph by Mr. F. C. Lowe.)

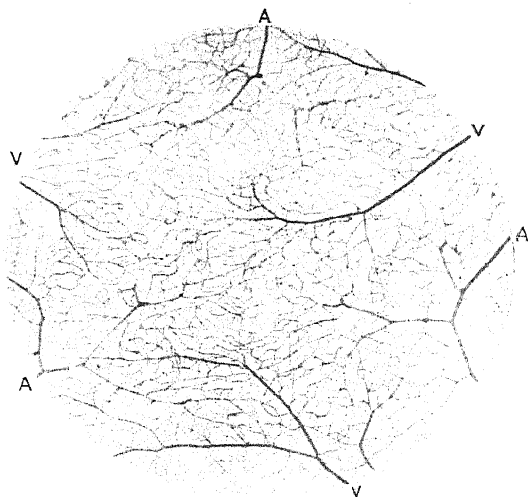


Fig. B.—From the same specimen as *Fig. A.* It shows the ultimate branches of three arterioles, the three corresponding venules, and their connecting capillaries. $\times 30$ diam.

Figs. A, B, C, by kind permission of the 'British Journal of Ophthalmology'

PLATE XX.

THE BLOOD-PRESSURE IN THE EYE—*continued*



Fig. C.—The central area of *Fig. B* more highly magnified. The arterioles and venules, together with the beginnings and endings of the capillaries, lie in one plane and are well defined, whereas parts of the capillaries lie in a different plane and are ill defined; when the latter parts are focussed they appear no larger than the others. $\times 60$ diams.

Assuming the data to be fairly trustworthy (*vide infra*, however, as to the pressure in the retinal artery), we may conclude that in a healthy eye with a chamber-pressure of 24 mm. the pressure in the retinal capillaries is probably not far removed from 40 mm.

Bailliant's method of measuring retinal blood-pressure is described by Priestley Smith.² This is a matter of much interest and importance, for it gives a means of measuring the blood-pressure in an artery of the size of the central retinal artery which is of great interest, especially in the study of arterio-sclerosis, for it is important to discover the site of the dissipation of the abnormal blood-pressure of this disease. The method adopted is one first suggested by Foster Moore, but not worked out by him in detail. It consists in ascertaining the degree of chamber-pressure which balances first the diastolic, then the systolic, pressure in the retinal artery. The instrument used is a dynamometer containing a spiral spring and acting as a delicate spring-balance. This is applied to the eyeball between the upper and external recti muscles, and the pressure is gradually increased whilst the retinal artery is watched by means of an electric ophthalmoscope. The pressure as indicated by the dynamometer is noted when pulsation first appears in the artery, and again when pulsation is on the point of being arrested. These two figures then give the amount of force which it is necessary to employ in order to balance the diastolic and systolic pressures in the artery. We may suppose, for instance, a reading of 25 mm. in the first case and 75 mm. in the second. The next step is to ascertain by means of Schiötz's tonometer the height to which the chamber-pressure rises when the eye is subjected to these pressures. That is to say, the dynamometer is applied and pressure exerted till this reads 25 mm. in the case we have supposed, and a reading then taken with Schiötz's tonometer. Another reading is taken when exerting a pressure of 75 mm. with the dynamometer. If it be supposed that the readings with the tonometer correspond with pressures of say 26 mm. and 50 mm., these will be the diastolic and systolic pressures in the retinal artery of that eye. The author states that the principle of Bailliant's procedure appears to be entirely sound. Bailliant, by his method, estimates that the average diastolic pressure in the artery is 25 mm. and systolic 50 mm. It will be seen that these differ markedly from previously accepted figures.

Colour Vision.—George Young³ has some original and interesting observations upon colour vision. He suggests that some human colour sensations are the product of a succession of retinal stimuli of various degrees of light intensity, differing in principle from the unequal refrangibility of light. He shows that a disc composed of sectors of grey, white, and black in certain proportions creates colour instantly when revolved, and that different colour effects are produced if the proportions and successions are changed. Thus, the disc referred to, when revolved in one direction, produces a sensation of yellow, whilst when rotated in the opposite direction a purple sensation follows, and by further modifying the disc a pronounced play of colour results. The author, with reason, suggests that this is a field of investigation worth exploring.

Ophthalmoscopic Examination under Red-free Light.—Affalter⁴ has experimented with this method. The source of light was an arc lamp, the red rays being removed by means of a two-chambered filter; in the first chamber a 30 per cent solution of copper sulphate was placed, and in the second a solution of 0.0078 erioviridin-B in 100 of water. By this means all the red rays are eliminated. The following are some of the observations made by this method of examination: The intravital colour of the macula is yellow; a number of retinal reflexes become visible which are not seen by other means; the nerve fibres of the retina are seen, and the way they encircle

the macula and turn to the periphery is visible. In two albinotic patients no macula was visible.

Keratitis with Hypopyon.—Teulières⁵ advocates the following line of treatment: In the first place, dissect out the lachrymal sac if it is suppurating; curette the ulcer, and paint its surface with 1-20 Tincture of Iodine; perform a Sæmisch section of the cornea; make a subconjunctival injection of Cyanide of Mercury; instil atropine.

REFERENCES.—¹*Brit. Jour. Ophth.* 1918, May, 257; ²*Ibid.* Sept., 487; ³*Ibid.* Aug., 430; ⁴*Arch. f. Ophth.* 1917, xciv, Sept. (abstr. *Brit. Jour. Ophth.* 1918, April, 248); ⁵*Presse Méd.* 1917, Sept. 13, 536.

EYE, PLASTIC OPERATIONS ON.

R. Foster Moore, F.R.C.S.

A Cartilage Prosthesis for the Eye.—J. L. Aymard¹ recommends the use of a ball of cartilage made up of two hemispheres from the cartilage of the eighth rib, joined together by catgut. The same procedure is recommended by F. Terrien.²

Contracted Sockets: Reconstitution of the Lower Cul-de-sac by Cutaneous Autoplasty.—Marcel Danis³ describes a procedure designed to reconstitute a lower conjunctival cul-de-sac. A long vertical finger-like flap is dissected up from the temporal region, being left attached below, at about the level of the

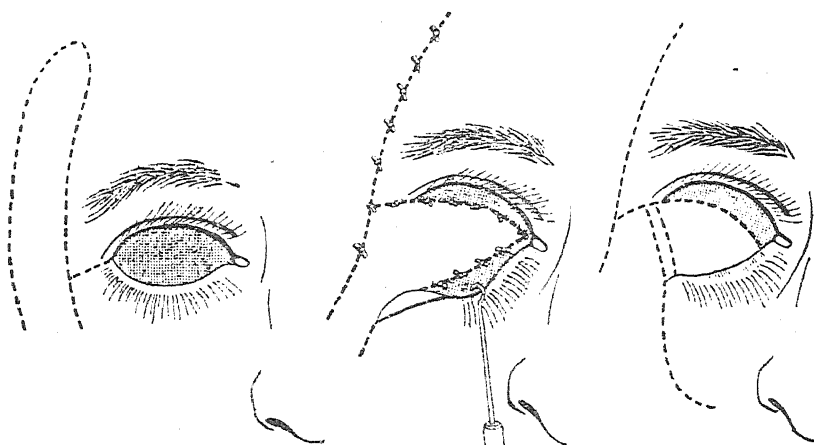


Fig. 53.

Fig. 54.

Fig. 55.

Figs. 53-55.—Reconstitution of the lower cul-de-sac by cutaneous autoplasty.
(Kindly lent by the 'British Journal of Ophthalmology'.)

lower orbital margin. The external canthus is now slit as far outwards as the flap. The contracted conjunctiva is then incised as far as the caruncle, and the flap is turned into the orbit, its edges being sewn to the cut conjunctiva. The flap is severed at its base later. (Figs. 53-55.)

A method recommended by F. Allport⁴ is especially suited to cases where there is marked contraction with cicatrization of the lids. A vertical incision is made right down to the orbital margin so as to separate completely the lid from the contents of the orbit. A piece of block tin is now cut into a half-moon shape, five or six holes being bored into its upper margin. This tin is then clothed by a Thiersch's graft, and inserted into the cut which has already been made. The graft is fixed on to the tin by means of stitches passed through the holes which have been made previously. The graft-covered tin is kept in

position by sewing the lids together. The sutures uniting the lids are removed on either the second or the third day. Fresh grafts may be necessary later at the points where the original graft does not take. The upper lid is treated later in a similar fashion.

REFERENCES.—¹*Lancet*, 1917, ii, 644; ²*Arch. d'Ophtal.* 1917, xxxv, 524; ³*Brit. Jour. Opth.* 1918, June, 332; ⁴*N. Y. Med. Jour.* 1918, i, 484.

EYE: VISUAL STANDARDS.

R. Foster Moore, F.R.C.S.

Evaluation of the Reduction of Working Capacity in Hemianopia.—Emile Rosquin¹ reviews the varying estimates which different authorities have formed, as to the extent of the incapacity which is consequent upon the different degrees and types of hemianopia (using this term loosely) which result from war wounds. He endeavours to formulate general rules to assist in the uniform evaluation of the resulting incapacity, for purposes of compensation. The subject is considered very carefully and fully. Pierre Marie and Chatelain state that 10 per cent of wounds of the skull are accompanied by some degree of hemianopia. The course and cerebral connections of the nerve fibres from the retina are considered in some detail.

Three methods of evaluating these defects are noted:—

1. Morax, Moreau, and Genet consider that a typical hemianopia reduces the capacity for work by 36 per cent, and this is distributed as follows: 6 per cent for each nasal quadrant and 12 per cent for each temporal quadrant, seeing that the temporal quadrant is about twice the area of the nasal.

2. Genet proposes to divide the visual field of each eye into tenths; the loss of the first ten of these divisions he values at 30 per cent, and each of the remaining tenths at 7 per cent.

3. Lagrange, starting from a basis of 120 per cent, gives 60 per cent for central vision and 60 per cent for peripheral; the peripheral fields are further subdivided and valued separately.

The author considers, in opposition to some, that no difference should be made between right and left hemianopia for the purposes under consideration; but he is in agreement that the loss of the lower half of the fields is of greater importance than the upper half. He also agrees with the principle that where, half the visual fields having been lost, the second halves become encroached upon, the resulting incapacity no longer remains in proportion to loss of visual field, but is evaluated by him as double that of the first halves.

The method suggested by Rosquin is as follows: (1) A vertical line is drawn through the fixation point; (2) The portion of the temporal field adjacent to this line is now cut off equal to the nasal field; this divides the temporal field roughly into two equal parts; (3) A horizontal line is now drawn through the fixation point. By this means the visual field of each eye is divided into 8 portions, as follows: 2 macula portions, a nasal and a temporal, each valued at 3 per cent; 2 nasal portions, a superior valued at 5 per cent and an inferior valued at 9 per cent; 4 temporal portions, an inner superior portion valued at 5 per cent, an outer superior portion valued at 2 per cent, an inner inferior portion valued at 9 per cent, an outer inferior portion valued at 4 per cent. As already stated, these values become doubled for the second halves of the visual fields where the first halves have already been lost; this brings the value for complete loss to 120 per cent.

Hanford McKee,² in a paper on military ophthalmology, says: "I consider a soldier who is anxious to do his duty and has only $\frac{3}{8}$ vision in each eye infinitely more useful and a better soldier in every respect than the disgruntled man with $\frac{6}{8}$ in each eye." The rarity of gonorrhoeal ophthalmia and trachoma is commented upon, as also the association of conjunctivitis with dysentery.

The author suggests that some cases of night blindness may be attributed to exposure, hard work, and great fatigue consequent on service. Amongst 105 cases of iritis, the Wassermann reaction was positive in only 33.

Moret³ devotes a long article to the consideration of the standard of vision which should be required for the different branches of the army. The standards set in all the belligerent armies are surveyed.

REFERENCES.—¹*Arch. méd. Belges*, 1918, Jan., 32; ²*Brit. Med. Jour.* 1918, ii, 340; ³*Arch. méd. Belges*, 1918, July, 47.

FACE, GUNSHOT INJURIES OF. (*See* JAWS AND FACE.)

FACE, PLASTIC SURGERY OF. (*See* ORTHOPÆDIC SURGERY.)

FACIAL PARALYSIS. (*See* OTITIS MEDIA.)

FEMUR, GUNSHOT FRACTURES OF. (*E. W. Hey Groves, M.S., F.R.C.S.*
(*See also* BONE GRAFTING.) (*C. A. Joll, M.S., F.R.C.S.*)

Probably there is no surgical subject which has given rise to so much controversy and discussion throughout the war as that of the treatment of gunshot fractures of the femur. During the past year there has not been much added to our knowledge of this subject in current surgical literature, but on general principles there has been a consensus of opinion, the summary of which may be of value now that the war is over and we have to answer the question, "What has been learned?"

We have no hesitation in saying that immense progress has been made during the past two years, as judged by results obtained in the British Army, but this progress has been due to increased efficiency in organization rather than to any new technical advance. Two years ago it was quite exceptional to see a man who had made a really good functional recovery from a gunshot fracture of the femur. Now good recoveries are the rule and failures the exception. Two administrative principles have brought about this happy change. These are the principles of segregation and continuous treatment. So long as fractured femurs were mixed with other cases, and sent from one hospital to another, their proper treatment was hopeless. At the seat of war a man was put up in a splint, and kept until his wounds were healing, and then sent, after perhaps a month, to this country. The medical officer at this first stage considered that accurate bone position must be left until the patient was settled in a home hospital. Then, on the arrival of the case in England, a month-old fracture put up on a splint was regarded as one which required no more active treatment, and was soon transferred to an auxiliary hospital, when in the third month the splint was removed. Every case thus came under the care of three or four different surgeons, each of whom would disclaim responsibility for a bad result. Far better results in fractured femurs were obtained by the rough and ready methods employed in the Balkan War by Borchgrevink and others, than by all the wealth and resource in technique and personnel at the disposal of the British authorities during the first years of this war. This was due to the fact that in the Balkan War the femur cases were segregated and kept under the same treatment until their functional recovery. We hold that these two principles ought now and in all future times to be held inviolate. Cases should be placed in groups of 100 or more in special hospitals, where teams of nurses, orderlies, and medical officers can be trained to work together, and they should be kept under such treatment until they can walk.

The early treatment of the wounds has also undergone a great improvement. This treatment is summarized by Gray,⁸ to whom is largely due the

credit of introducing it. The most important point is that every infected wound should be treated at an early period—i.e., within twenty-four hours—before sepsis has become deeply implanted in the tissues. The devitalized tissues must be excised as widely as anatomical conditions will permit, and then primary or delayed primary suture can be undertaken with a good prospect of converting the fracture into a closed aseptic type. The possibilities of such early suture are well described by Fraser and his collaborators.¹² Two points of warning are necessary in order to avoid mistakes and disappointment. In the first place, there is a very real risk of suture being undertaken before sterilization of the deep tissues has been effected; deep closed suppuration will then occur, and may lead to disaster. The other point is that a larger number of cases of delayed bone union occur after primary open operation than under the old expectant policy; this is probably due to stripping of the bone-ends of their vascular envelope by the operative exploration.

The early splinting of the fractured femur, especially with regard to transport, has been settled beyond all doubt by the universal adoption of the Thomas knee-splint for this purpose. The splint has a large ring which goes easily over the man's trousers, and the foot is fixed by a rod through the boot or by some simple frame foot-piece. These methods are described by Williams.⁵ After the patient has been to the casualty clearing station and had his wounds treated there, he is again placed on the Thomas splint, traction being made on the leg, and extension secured by strapping or glued gauze, the foot being adjusted in a foot-frame. With this application the patient is moved to the special hospital where his final treatment is to be undertaken. There is only one condition which prevents the use of the Thomas splint in the early stages of treatment, and that is the existence of severe wounds in the region of the buttock or groin. For this, although Jones's abduction frame has been advocated, it has not met with general adoption, because of its cumbersome nature and the discomfort which its use involves. Crile¹¹ has devised a very useful type of splint for such cases, which somewhat resembles a Thomas knee-splint, but has the ring fitted for the sound thigh. If this can be simplified and standardized, it will probably be of great value.

We now have to consider the treatment of fractured femurs in the special hospital where the bone has to be finally healed in good functional position.^{1 2 4 0} And first it is necessary to reconsider the rôle of the Thomas splint, for this appliance has been the one used almost to the exclusion of everything else. But although it has been advocated by the highest clinical experts, and officially adopted by the administrative authorities, it is highly significant that the manner of its use has been so largely modified as to produce a method almost exactly contrary to that which its original protagonists advised. The original 'Thomas splint' proposition may be summarized thus: (1) The splint ring must fit the patient's thigh; (2) The leg is to be pulled down by a single or repeated act of traction to its full length and tied to the lower end, and this passive extension requires no further active extending force; (3) The hip- and knee-joints are to be kept fully extended throughout the treatment; (4) Adhesive appliances attached to the skin of the leg are sufficient to exert all the necessary traction. Now, it is probable that the great majority of the surgeons working in the special fracture hospitals began their work upon these lines with a very strong bias in favour of the truth of these dogmas. And yet the steady evolution of the method has been away from these principles in almost every particular, although the Thomas splint has been retained. Thus, taking the four points seriatim: (1) The splint used has been one with a large thigh ring. The accurately fitting ring has been discarded, because of the difficulty of passing it over a swollen thigh, and the danger of causing

constriction of an acutely inflamed leg. When the fitting ring is given up, then either all idea of counter-extension from the ischium is abandoned, or else an attempt is made to keep the ring against the ischium, by slinging it up to an overhead beam. (2) Extension by manual traction has been found generally inefficient, and has had to be supplemented by various devices, such as the slinging-up of the leg so as to make the body-weight act as an extending force, or fixing a weight-and-pulley arrangement to the lower end of the splint so as to substitute an active for a passive extension. (3) It is generally recognized that the extended position of the hip and knee is wrong, not only because this position gives the maximum tension to the hamstring muscles, but because in upper-third fractures the proximal fragment tilts forwards, and in lower-third fractures the distal fragment tilts backwards; whilst with the flexed position of the joints the main portion of the shaft is brought into alinement with the tilted fragment in both these deformities. The position of flexion has been attained by those who use the Thomas splint in various ways: either by bending the splint at the knee, or by attaching a hinged member to it opposite the knee-joint, and allowing the leg to drop back with flexion of the hip and knee, the extension then being made from the lower end of the femur itself. (4) The extension of the leg by adhesive appliances is admitted to be inapplicable or inefficient in very many cases. This is because of extensive wounds of the soft parts, or because the skin will not stand the prolonged tension which is necessary. Various devices are used to obtain a direct hold upon the bones below the fracture. A transfixion-pin driven through the lower end of the femur is the simplest and most effective of these. But a certain proportion of cases of sepsis spreading from the pin-holes into the thigh or the knee-joint has been the reason for seeking another method. By far the simplest of these consists in transfixion of the tibia just below and behind the tubercle. This can be done by a pin only $\frac{1}{8}$ in. thick, and is absolutely free from any danger of septic extension. But the method which has had the greatest vogue lately is the use of a calliper² or ice-tongs, and these have been put forward in various patterns. The calliper is applied to the lower end of the femur, and is intended to grip the bone without penetrating deeply into its substance. Whilst admitting the efficacy of these callipers, we do not consider that any valid arguments have been brought forward showing either their superiority over the transfixion-pin, or that their use avoids the dangers incident to the latter. Sepsis from a transfixion-pin is due to its action as a seton—i.e., the keeping open of a passage from the external skin into the deep tissues—and this action is fully manifested by the calliper. Thus Glaspel,⁷ in advocating the use of Beseley's callipers, admits that in 18 per cent of the cases septic infection occurred. He also refers to cases where the callipers tore out. One other method of direct pull upon the bones deserves mention, because it has been used so largely by French and Italian surgeons.³ It is the Finocchetti stirrup. This appliance consists of a steel band passed over the upper surface of the os calcis just in front of the insertion of the tendo Achillis. In our opinion it has nothing to recommend it, as it is very painful, owing to the fact that it chafes against the skin with every movement, and it is not nearly so effectual as a transfixion-pin.

The direct operative suture of septic fractures has been almost entirely abandoned. The application of plates and screws causes extensive necrosis, and the momentary gain is more than lost by delay in vital union and the loss of bone. Probably in a few special cases of oblique fractures without comminution, where the ends of the bone can be seen in the wound, the application of a wire suture⁶ will sometimes serve to correct a faulty position. The wire ends are left long, and serve to facilitate removal when consolidation has

been effected. The question of the treatment of the separate fragments in comminuted fractures has not been settled beyond dispute. There are two extreme views. On the one hand, Leriche, of Lyons, holds that all loose fragments should be carefully removed by a sharp elevator from the periosteum, which may be trusted to re-form the bone. Sir Robert Jones, on the other hand, thinks every fragment should be preserved, and that even those which come away during operative toilette should be washed and replaced. The truth probably lies between these two extremes. The right course would seem to be to leave all fragments which have vascular connections, and to remove those which are free. Two things are quite certain: we see many cases in which free removal of bone fragments is followed by an absence of osseous regeneration and consequent non-union; and further, evidence of regeneration of the shaft of a long bone after removal of a portion of its total thickness is extraordinarily difficult to obtain. We are not aware of any such evidence in publications accessible to ourselves, and we shall continue to be doubtful of the re-formation of bone until such evidence is forthcoming.

REFERENCES.—¹Ogilvie, *Brit. Jour. Surg.* 1918, Oct., 166; ²Pearson, *Brit. Med. Jour.* 1918, Aug. 24; ³Caneva, *L'Ospedale Maggiore*, v, No. 9; ⁴Eastman and Bettman, *Surg. Gyn. and Obst.* 1917, Oct.; ⁵Williams, *Brit. Med. Jour.* 1918, June 8; ⁶Turner, *Lancet*, 1918, July 20; ⁷Glaspeil, *Jour. Amer. Med. Assoc.* 1918, Aug. 24; ⁸Gray, *N. Y. Med. Jour.* 1918, June 22; ⁹West, *Lancet*, 1918, Jan. 12; ¹⁰Watkin Williams, *Ibid.* Oct. 5; ¹¹Chile, *Brit. Med. Jour.* 1918, April 27; ¹²Forbes Fraser, *Brit. Jour. Surg.* 1918, July, 92.

FILARIASIS.

Sir Leonard Rogers, M.D., F.R.C.P.

A. Breinl and H. Priestley¹ describe two unusual cases seen in North Queensland. In the first, over a swelling in the groin, blisters appeared, from which chylous fluid escaped; the affected skin was excised, with a good result. In the other, acute fatal abdominal symptoms were found after death to have been due to the leakage into the abdominal cavity of a large quantity of chylous fluid from a mass of enlarged posterior abdominal lymphatics.

W. Yorke and B. Blacklock² record careful observations on the periodicity of *Filaria nocturna*, and conclude that reversing the hours of sleep only gradually alters the maximum prevalence, and that the number of larvæ in the urine in chyluria is dependent on the amount of blood present, and has the same periodicity as the blood.

REFERENCES.—¹*Jour. Trop. Med. and Hyg.* 1917, Nov. 15, 253; ²*Ann. Trop. Med. and Parasit.* 1917, Aug. 23, 127.

FILARIASIS, CIRCUMOCULAR.

R. Foster Moore, F.R.C.S.

E. J. Stuckey¹ gives an interesting account of the finding of four thread-like worms in the conjunctival sac of a Chinaman. Shortly afterwards Stuckey was informed by Rev. T. Biggin, Professor of Biology in Tungchow Arts College, that worms had been removed from the eyes of his pet dog. These parasites were sent to Dr. Henry S. Houghton, of the Harvard Medical School, Shanghai, who supplies a

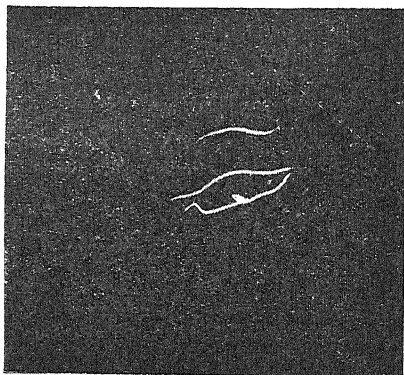


Fig. 56.—*Filaria palpebralis* (natural size).

full and interesting report. He believes the specimens found in the patient and in the dog are *Filaria palpebralis*, Wilson, 1884. (See Fig. 56 and Plate XXI).

Leiper² refers to Stuckey's case, and also to one reported by Trimble in a Chinese farmer. In the latter case the worms were apparently responsible for a marked degree of ectropion. The author quotes six species of *thelazia* which are recognized by Railliet as occurring in mammals. He states: "From the illustration accompanying Dr. Houghton's description it is clear that the parasites of 'circumocular filariasis' in man belong to the genus *thelazia*, and as they are said to correspond so closely to those found in the dog in the same part of the world, there seems good ground for an assumption that they may be examples of the species *Thelazia callipæda*, which is apparently a common eye-worm in the dog in Asia, and was first recorded from the Punjab by Railliet and Henry in 1910."

REFERENCES.—¹*Brit. Jour. Ophth.* 1917, Sept., 542; ²*Ibid.* 546.

FINGER CRACKS.

E. Graham Little, M.D., F.R.C.P.

The following methods have been recommended to promote healing of these. A piece of Shoemaker's Wax is to be heated and the crack filled with it. One application is usually sufficient. Or a solution of Celluloid in ether and amyl acetate may be used. The crack is to be stretched open and the fissure filled from the bottom. Or a thin wisp of cotton-wool is placed over the crack and the part soaked with 'Epicollid' prepared by Duncan and Flockhart, of Edinburgh.

REFERENCE.—¹*Brit. Med. Jour.* 1918, i, 137.

FOOT, DEFORMITIES OF. (See also BONE GRAFTS.).

W. I. de C. Wheeler, F.R.C.S.I.

Club-foot.—Zadek and Barnett,¹ discussing club-foot, state that the varus is often overcome by manipulation, but the equinus remains. They state that the posterior ligaments of the ankle-joint should be cut subcutaneously, and that this can be easily accomplished. Mere division of the tendo Achillis is often ineffectual. The technique they have employed has been to use a tenotomy knife with a long shank and small blade with a cutting edge only on one side. The knife is inserted on the inner side of the ankle just at the inner edge of the Achilles tendon, and on a level with the tip of the internal malleolus. The back of the blade is turned inward. After penetrating from a quarter to half an inch, depending on the age of the patient, the blade is turned so as to lift the vessels, nerves, and other structures up on its back, and the blade is pushed deeper. Maintaining this position, the blade is swept outward from the internal malleolus while pushing up on the foot. There is an audible and palpable grating while the sawing motion is in progress. After all the resistant structures have been cut, the tenotome is withdrawn and the foot is pushed up. There is a give, and sometimes an audible cracking. One then finds the os calcis tilted up. They have thus far treated in the manner described twelve club-feet. They give a caution against using this procedure soon after manual correction has been attempted, as the foot, broken and weakened at the medio-tarsal joint, will give at this point, and thus will not allow sufficient leverage to obtain the desired dorsal flexion of the foot as a whole.

Hallux Valgus.—Hatch² describes an operation for this condition. A curved incision is made over the metatarso-phalangeal joint of the great toe, with the base downward. The skin is dissected back and the bursa carefully removed. The head of the metatarsal is dissected free, and, with an osteotome, a cut is made half-way through the bone at right angles to the shaft, just back of the head. The osteotome is then removed and inserted in the centre of the shaft,

PLATE XXI.

CIRCUMOCULAR FILARIASIS IN MAN

(*Filaria Palpebralis*, Wilson, 1881)

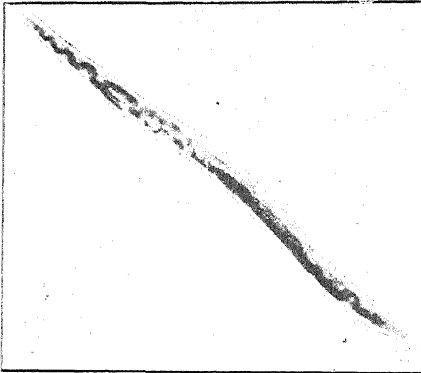


Fig. A.—*F. palpebralis*, male. ($\times 12$.)

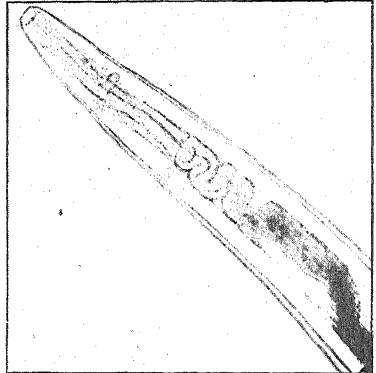


Fig. B.—Head of *F. palpebralis*. ($\times 80$.)



Fig. C.—Tail of female.

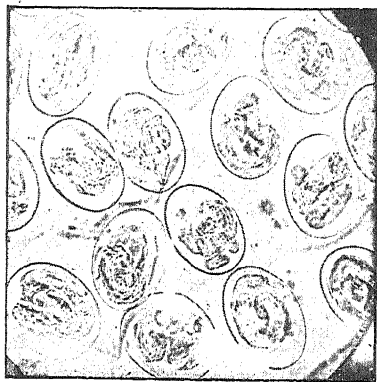


Fig. D.—Embryos of *F. palpebralis*. ($\times 320$.)

(By kind permission of the British Journal of Ophthalmology.)

and the inner half of the head is chiselled off. Any rough edges that are present are now smoothed off. If the tendon of the extensor proprius pollicis is much shortened, it is tenotomized or lengthened. This happens in very few of the cases. This leaves a good portion of the outside of the head to articulate with the first phalanx. The joint has not been injured, while all of the projecting part of the head has been removed. The leaving of half of the head, with its articulating cartilage, makes a better joint than would be secured by taking off the piece of bone at an angle. The subcutaneous tissue is united by catgut sutures and the skin sewed with silk-worm-gut. A pad of felt is put between the first and second toes, and a light plaster cast applied, including the ankle, to protect the foot. The stitches are removed on the tenth day, and the patient is allowed up about the twelfth to the fourteenth day. This operation allows the patients to be walking in two weeks, and in eighteen or twenty days they are able to put on any ordinary shoe. It is very important for them to wear a shoe with a straight inside last, and Porter says, "If you cannot dictate the shoes do not do the operation." Several of Hatch's cases will not wear a proper shoe, and seem to be very comfortable in their most stylish types. In some cases, when the anterior arch is much relaxed, a spoon-shaped plate made of very light steel—22-gauge—is necessary for complete relief.

Wheeler³ states that excision of the affected metacarpophalangeal joint should never be performed for hallux valgus. Such an operation may lead to hallux rigidus, which is a most crippling deformity. He recommends: (1) In early cases of valgoid deformity of the great toe without any marked exostosis, the

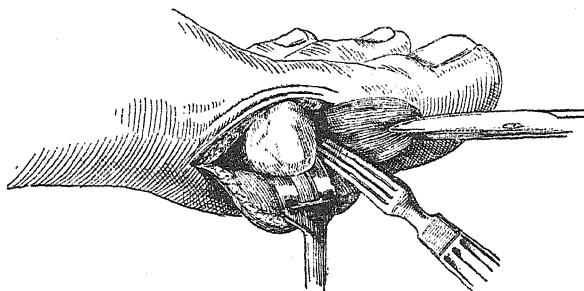


Fig. 57.—Operation for hallux valgus (Wheeler).

best result is obtained by linear or cuneiform osteotomy of the neck of the bone, with tenotomy of the long extensor tendon; (2) In more severe cases, free excision of the head of the metatarsal bone, leaving as much as possible of the under weight-bearing surface, will be found satisfactory. If the bursa is preserved to cover the raw bony surface, Sir Robert Jones states that one wall only of the bursa should be used. Retention of the entire bursa has been followed by bursitis. The long extensor tendon must be divided in all cases. The operation is shown in Fig. 57.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1917, ii, 1057; ²*Surg. Gyn. and Obst.* (abstr.) 1917, Nov., 447; ³*Operative Surgery*, 3rd ed., 195.

FRACTURES. (See also FEMUR, FRACTURED.) {E. W. Hey Groves, M.S., F.R.C.S.
{A. C. Joll, M.S., F.R.C.S.

GENERAL CONSIDERATIONS.

Lane¹ divides the fractures of warfare into: (1) Simple fractures; (2) Compound fractures not produced by projectiles; and (3) Compound fractures produced by projectiles. He considers that simple fractures have been worse treated than any other during the war, and he ascribes this to a want of familiarity with the mechanics of fractures or to an imperfect operative technique.

Among others, he singles out Colles's fracture and forward dislocation of the semilunar at the wrist for special mention as being lesions that are easily detected with the aid of skiagraphy, and yet frequently allowed to remain in bad position. Lane adopts the attitude that loosening of screws, etc., after plating is due not to the essential tendency of these metallic materials to become surrounded by a zone of rarefaction, but to a failure of perfect asepsis, and argues that if plating is successful it is because the technique has been perfect, while if it fail it has been faulty. The cutting away of portions of the bone to permit easy adaptation of the ends or to secure axial accuracy is a faulty procedure according to this author, and he also warns against the use of plates which are too short or of inadequate strength. Screws, he says, are often of the wrong type, and the drill used to prepare for them is often of the wrong gauge. After operation great care is necessary to keep the part at rest, so that great strains are not imposed on the screws too soon. If in a simple fracture the surgeon cannot replace the fragments in accurate apposition under an anæsthetic, then it is his duty to operate and restore the bone to its normal form.

Compound Fractures.—Lane¹ regards the methods of Sinclair as the best he has seen for the treatment of these fractures, and he sounds a warning note against the free removal of fragments, especially in the fractures about the elbow-joint. He admits that it is seldom justifiable to plate these compound fractures, and in those exceptional cases the plate must be fixed to the fragments well away from the line of fracture, and the wound must be freely drained and rapidly sterilized. If the wound has healed and the fragments are in such bad position as to affect adversely the function of the limb, it is advisable to give a preliminary course of treatment with x rays or radium, perhaps combined with a vaccine to minimize the risk of lighting up suppuration at the time of operation. A bone-graft taken from the neighbourhood of the fracture should be used where there is a gap to be filled in, and a plate should be used to bridge the gap and to take a firm hold on the fragments. *

This author advises that, as far as is compatible with the avoidance of undue strains, the patient's joints in the neighbourhood of the fracture should be moved as early as possible, and he should be got up in an ambulatory splint without delay, as this favours the production of callus. In operations on these cases Lane rarely uses a ligature, but relies on powerful hæmostatic forceps, which are allowed to remain until the end of the operation. The paper is illustrated with a number of skiagraphic plates, but not taken in two planes at right angles to each other, as one of us (E. W. H. G.) has insisted on (*Modern Methods of Treating Fractures*).

Taylor and McLeod² deal with the operative treatment of compound war fractures after they have healed and when they are in faulty position. In simple fractures they operate if, after a trial of extension for a fortnight, the fragments are still in an unsatisfactory position; delay much beyond this is liable to impose greater difficulties, because the callus has to be removed, the sharp outlines of the fragments are obscured, and the bone-ends do not hold screws so well. They adopt the Lane technique in its entirety. In the healed type of compound fracture which is in bad position, Taylor and McLeod first try to improve the nutrition of the limb by massage, hot-air baths, electrical treatment, etc., and this treatment often lights up infection again, and therefore is a most valuable test as to whether the limb is in a fit stage to be operated on. Only when the gradual employment of these tests has been followed by no appreciable reaction is the operation undertaken.

In the transverse type of fracture, it is generally possible to grasp the ends with clamps, and then to fit the two ends together while they lie outside the

wound at an acute angle, when by leverage, using the point of contact as a fulcrum, the ends can be forced into exact apposition and there clamped, and the plating proceeded with. When the fracture is spiral, the above method is usually a failure, because the two oblique ends glide past each other when the limb is straightened. Sometimes the fractured surfaces can be made to lie in perfect apposition by utilizing the principle of the double inclined plane; a pair of powerful bone-holding forceps crush and hold the fragments together. Often it is necessary to slip a screw-driver or an elevator between the two ends, and by a rotatory movement of this the planes can be made to slip on each other, and apposition is effected. Another method which they use is to clamp the two planes together with one pair of holding forceps. The other pair is then applied with its jaws a little oblique to the axis of the bone; the first pair is now relaxed slightly and the second is tightened—the planes slide, the obliquity of the forceps disappears, and they come to grip transversely. This process may have to be completed in several stages.

Grant³ describes a method of fixation using a series of handled screws which he calls 'gimlets.' These are introduced through the ordinary wound and then clamped together by external clamps, and extra 'gimlets' are introduced through stab wounds if necessary, and the wound is closed in layers. A plaster-of-Paris bandage is generally necessary afterwards for a week or two, with a window for inspection. The 'gimlets' are removed as a rule in from eighteen to twenty days.

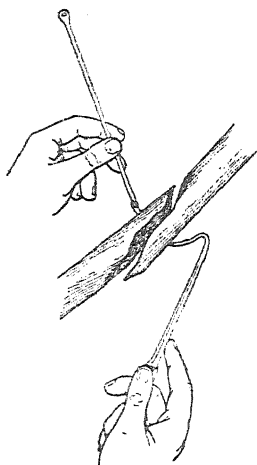


Fig. 58.—Tanton's osteosynthesis by cerclage.

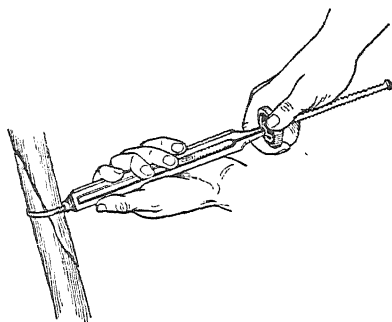


Fig. 59.—Tanton's osteosynthesis.
(Figs. 58, 59 redrawn from 'La Presse Médicale'.)

Delbet¹ strongly inveighs against the methods of Lucas-Championnière in the treatment of war fractures, claiming that if it has produced some good results, it has also given many very bad ones. In plating, he uses very long plates, and considers that the danger of infection of open fractures in war is slight if adequate drainage is provided for.

Tanton⁵ considers the indications for osteosynthesis (or fixation of the fragments by means of wires, plates, etc.), and concludes that in war surgery it is legitimate to use this method whenever primary union of the soft parts is aimed at by suture at an early stage, and also when the wound has been left widely open under certain conditions. Tanton adopts a modification of Parham's method in such cases, and gives clear illustrations of the technique he uses (Figs. 58, 59). The cases suitable for this type of fixation are, according

to the writer: (1) Fractures by contact, with two oblique or spiral fractured surfaces; (2) Fractures by contact, with three fragments, the third fragment being rhomboidal and more or less completely detached; (3) A certain number of fractures by perforation, with much comminution, where, combined with esquillectomy, the use of the *cerclage* band will restore the continuity of the fragments—these cases are exceptional. The special instruments necessary are the metal band used as a ligature, the *serre-nœud*, and a ligature-carrier which is used to convey the metal band around the bone fragments. The ligature-carrier having been passed round the fragments, it is made to engage the eyelet-hole in the metal ligature band by means of the crochets end with which it is furnished, and the ligature is then drawn into place and its terminal end passed through the hole in its proximal end. The *serre-nœud* is then attached, and the band slowly and carefully tightened, and when this stage is completed the band is sharply bent at an acute angle by turning the *serre-nœud* through 90°, and the band is cut at about half an inch from the bone. The whole manœuvre is repeated until as many bands as necessary have been placed on the bone. If the fracture line is very oblique, stability can be increased by the use of a metal plate with three grooves over which three of the bands are tightened.

The Lyons school—at its head Leriche—has, since an early stage of the war, advocated the treatment of compound fractures by the free removal of fragments by what is termed ‘transosseous esquillectomy,’ basing the method on Ollier’s views as to the functional capacity of the periosteum in bone regeneration. Leriche has explained his method at length in his recent manuals on the treatment of war fractures, and also in several papers.^{6 8} He states⁶ that free subperiosteal esquillectomy is the only way to assure the favourable progress of the fracture, since it avoids the dangers of infection. In order to combat the view so frequently expressed that his method leads to pseudarthrosis, Leriche⁶ showed 20 cases treated by esquillectomy at intervals of seven to eighteen hours after the receipt of the wound—5 fractures of femur, 5 of bones of the leg, 4 of the humerus, and 6 of forearm bones. All the cases were healed, the bones consolidated, and the functions of the limbs restored within the normal range of time generally required by these fractures. Thus, for the forearm 25 days, for the humerus 30 days, for the femur 40 days, were required for firm union. He denies the statements of Heitz-Boyer and others that the results are unfavourable, and maintains that it is because his own technique is not followed out minutely that failure is met with; their method is, he says, not free esquillectomy, but total esquillectomy, and compares the difference between his method and theirs to the difference between partial and total gastrectomy. Another fault he finds with their methods is that they do not preserve the deep fragile firmly-adherent and osteogenetic layer of the periosteum, and he asserts that it can only be preserved by removing the superficial layer of the bone itself, so intimately bound together are these two structures. Leriche takes up the attitude that non-union and pseudarthrosis is due not to the methods he and the Lyons school use, but to the nature of the injuries, to bad reduction of the deformity, and to suppuration. To the claim that free esquillectomy has been rendered unnecessary by the use of primary suture of the wound, he makes the rejoinder that the successes reported by this method (Gross, etc.) concern mainly fractures as a result of contact, and that fractures with a large open wound are not included in Gross’s cases to any appreciable extent. Leriche maintains that it is folly to attempt to close a wound associated with a fracture of the bone involving the medullary cavity, and caused by a penetrating projectile, without a systematic exploration of the medullary canal for foreign bodies, etc., and he further claims

that to remove these it is generally necessary to take away two or three or even more fragments, which, while adherent, are still obstacles to the proper exposure of the damaged area. If plating is contemplated, it is even more necessary to do esquillectomy, in order that free drainage of the medullary canal shall occur after the operation.

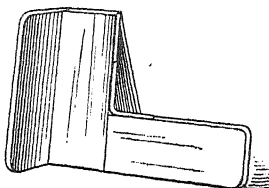
Heitz-Boyer and Scheikevitch⁷ studied the effect of esquillectomy in the young and in the adult (the latter both in the normal bone and in inflamed bone), and they conclude from their histological studies that it is only in normal adult bone that it is possible to do a true subperiosteal esquillectomy, and that in all other cases the operation is transosseous, i.e., the superficial layers of the bone are elevated with the periosteum. They claim that Ollier was aware of this; that Leriche has failed to grasp Ollier's point; but nevertheless obtained good results by the use of powerful instruments which raised with the periosteum flakes of bone which acted very much as Delagenière's grafts.

Leriche and Policard⁸ studied the histo-pathological changes which occur in the fragments which are denuded of periosteum, and they conclude that: (1) Bare bone with a white colour is in fact dead. The bone-cells are dead, or the lacunæ are empty. The Haversian system is either empty or the structure is lost. In the more superficial layers there is evidence of the invasion of the Haversian system by leucocytes and other inflammatory products, but there is still evidence of life in them. (2) The covering-in of the bare bone is not the result of the activity of the surrounding soft tissues, but is largely effected through the activity of the bone in the neighbourhood. If there has been a mild initial infection, this enclosure of the bare bone is preceded by superficial papery sequestrum-formation. The presence of metal plates, such as are used in bone-plating, inhibits the revascularization of the bone in the neighbourhood of the plates, according to these authors. (3) Bone which has gone through this process of denudation and revascularization is always distinguishable by the absence of living bone-cells—the lacunæ are always empty. The revascularization of the Haversian system is usually followed by the phenomena of resorption, just as with certain grafts.

SPECIAL FRACTURES.

Humerus.—Morton⁹ deals with the treatment of these cases by means of splints, and claims that to obtain absolute fixation of the fragments it is essential to make use of the chest wall to provide the necessary stability. He also draws attention to the necessity for placing the forearm in a proper angle in respect to the body, so that there shall be no improper rotation of the lower

Fig. 60.—Morton's internal angular splint in fractures of humerus. On the left is seen posterior portion attached at right angle to internal portion, which forms one side of triangle, and on this the arm rests. Another side of the triangle—that attached to side of chest—is just seen behind it. The forearm part of splint is seen projecting to the right, from the internal part.



fragment. For this purpose he uses an internal angular splint of which the forearm part is at an angle of 22° to the arm part, and he adds a piece of wood behind the humerus part of the splint for extra support. To the splint so formed Morton adds a triangular frame, which, while keeping the arm somewhat abducted, provides for the efficient fixation of the limb to the chest wall by means of plaster bandages. For fractures of the bone high up, this author

avoids the danger of over-abduction of the lower fragment by discarding the triangular part of the splint and fixing the postero-internal angular splint to the side of the chest directly with plaster bandages (*Fig. 60*).

Lower Limb.—Sneyd,¹⁰ speaking of sepsis, says that the various antiseptics which have from time to time been advocated have tended to make surgeons forget the fundamental principles of incision and drainage and extension, to the detriment of the patient. In cases where there is acute sepsis with lymphangitis, etc., Sneyd has seen benefit follow the use of autogenous **Vaccines** in doses of $\frac{1}{2}$ to 1 million, accompanied by a dose of antistreptococcal serum. He also uses in these cases a cream made of **Sulphur and Glycerin**, which is poured into the wound, covered with a large boracic fomentation, and left for forty-eight hours. In regard to the correction of deformity, this writer considers that if there is well-established sepsis, and the deformity cannot be corrected without forcible manipulation, it is better to let the wound heal, and at a safe interval to practise a formal open operation and plate the bone. He admits that these cases are often difficult, because the bone is sometimes so soft as not to be capable of holding the screws, and that several plates and screws, with careful after-treatment, are necessary to obtain success by this method.

Tibia.—Davison¹¹ deals with the spiral type of fracture of the tibia. He says they are always the result of torsion, and that the fibula is also always broken. The level of the fracture is at the junction of the middle and lower thirds of the bone. The fibular fracture is generally impacted, and is at a higher level. The impaction of the fibula is a serious bar to the reduction of the displacement, and the shape of the fractured surfaces precludes the tibia from uniting in good position as a rule, so that some form of operation is necessary. For this he recommends the use of the autogenous bone-graft, cut from the neighbourhood of the fracture itself. The primary function of this transplant is to obtain proper alinement of the fragments, and the actual union of the graft and the fragment is less essential, though advantageous. The details of the operation are given. They include the exposure of the fragments by means of a flap incision, the fracture of the fibula by means of a chisel, and the clearing of the medullary canals of the fragments in order to afford space for the graft. A transplant of suitable length is now cut from the crest of the tibia; it should be long enough to extend into each medullary canal for an inch at least. The graft is made so that it fits the upper fragment loosely, but must not allow rotation; the graft is now inserted tightly into the lower fragment, and the upper fragment is brought over the other end of the transplant; the wound is then closed, and the limb immobilized by means of a moulded plaster splint. Davison's article is very well illustrated by means of drawings and skiagrams.

THE TREATMENT OF FALSE JOINTS AND OF UNUNITED FRACTURES.

(See also BONE GRAFTING.)

Chutro¹² deals with these cases as they occur in war wounds, and refers to 75 examples of this condition, distributed as follows: clavicle 2, humerus 28, ulna 11, radius 9, radius and ulna 4, femur 10, tibia 10, tibia and fibula 1. He considers that the cause is uniformly the same throughout the series—loss of bone substance and periosteum, suppuration, sclerosis of the periosteum in the neighbourhood of the fracture, secondary interposition of soft parts. On the other hand, he does not believe in a routine treatment of these cases, but claims that many can be cured by merely freshening the ends and then putting up the fracture properly in complete immobilization. For the other cases, he thinks that plating is the best for the femur and the humerus, except in a few where it is not a question of the fragments being far apart, when an Albee's

graft may be preferable; for the bones of the forearm and leg he prefers a bone-graft to plating. After giving details of his results, Chutro describes certain technical features of his methods. He has given up the Albee saw, on the ground that it tends to kill the bone on account of the heat generated, and also it fills up the bone pores with dust; he therefore uses Murphy's forceps for this purpose. The graft is cut from the tibia as a rule, and the periosteum is removed attached to the graft; the latter is cut narrow rather than wide, with the idea that the narrow graft will take more readily. He does not use any method of metallic fixation of the graft, but relies on careful fitting into the two fragments. Chutro advises three months as the minimum period of fixation after the operation. Mauclaire, in the discussion which followed the reading of this paper, gave as his opinion that the greatest gap which could be bridged by a graft in these cases of pseudarthrosis is 6 in., and that this figure is not likely to be achieved unless the conditions are specially favourable. The interval after the healing of the wound should be about six months. Mauclaire prefers to fit the graft into the medullary canal of the fragments, and cuts the graft by means of an osteotome rather than the saw.

Brackett and New¹³ deal with the treatment of ununited fractures of the neck of the femur, at a stage when there has been considerable absorption of the head and neck—the articular part of the head is poorly nourished, and bleeds little when cut; but it is hardly a sequestrum as some have described it, since it still has a feeble blood-supply through the ligamentum teres. The attempt to use a nail or a bone-graft to unite the head to the neck is doomed to failure because of the softness of the head, which will not retain them. These authors utilize the head by fixing it to the sawn surface of the trochanter on its inner and upper side, with the idea of obtaining vascularization of the head in its new position, and when that has occurred the head will provide a satisfactory structure through which to transmit the body-weight. The joint is opened by the muscle-splitting route, the muscle attachments to the outer side of the trochanter are preserved by detaching them subperiosteally, the top of the trochanter is detached to preserve the gluteus medius and the pyramiformis, and the capsule is opened in the line of its fibres so as to preserve the Y ligament. The trochanter is now cut off just below the level of the upper edge of the head, and the inner portion is rounded to give a curve of about two inches radius, while the outer is either cut off obliquely or a wedge taken out near the outer surface. The free surface of the head is made concave to fit the convexity of the trochanter, the two are firmly pressed together, and the capsule is closed with the leg abducted, and the wound is then closed. A plaster splint is applied in the form of spica bandages of this material, taking in the affected limb from the ankle up, and the other from the knee, and the splint should include the lower part of the thorax; it is kept on for ten weeks.

The authors admit that shortening is not improved by this operation, and that it is a serious proceeding; but they claim that in a patient of reasonably sound health the relief from pain and the very considerable improvement in the range of movement possible makes the operation well worth doing.

REFERENCES.—¹*Lancet*, 1918, i, 4; ²*Ibid.* 405; ³*Surg. Gyn. and Obst.* (abstr.), 1917, ii, 232; ⁴*Ibid.* 532; ⁵*Presse Méd.* 1918, June 24, 317; ⁶*Ibid.* Dec. 27, 1917, 735; ⁷*Ibid.* 1918, Sept. 5, 452; ⁸*Ibid.* Sept. 19, 479; ⁹*Lancet*, 1918, ii, 77; ¹⁰*Ibid.* i, 524; ¹¹*Amer. Jour. Med. Sci.* 1918, i, 323; ¹²*Presse Méd.* 1918, Aug. 5, 411; ¹³*Boston Med. and Surg. Jour.* 1917, ii, 351.

FURUNCULOSIS. (See SKIN, STAPHYLOCOCCAL INFECTIONS OF.)

Yeast, use of (p. 8).

GALL-BLADDER, SURGERY OF. (See BILE-TRACT AND LIVER; AND p. 31.)

GAS POISONING, WAR.*Arthur Latham, M.D., F.R.C.P.*

The Chemical Warfare Medical Committee¹ reports that in gas poisoning, whether by suffocation or vesicant fumes, if the patient is not treated in the early stage by the administration of Oxygen, there is deficient oxygenation of the blood, and to this some of the late signs and symptoms would appear to be attributable. These late signs and symptoms, which occur most frequently after phosgene gas poisoning, closely resemble those of 'D.A.H.' or the 'effort syndrome,' and are often complicated by functional nervous disturbances. In the treatment of these general symptoms, prolonged rest in bed is contra-indicated. The patients should be encouraged early to undertake increasing amounts of Exercise, either by graduated physical exercises or by definite amounts of walking. The effect of the exercises must be carefully watched, and if there is obvious respiratory distress for more than a few minutes, or if the pulse-rate remains appreciably above the resting rate for more than five minutes, the exercise must be adjudged too severe.

In mustard-gas poisoning, the use of protective measures for the eyes should not be continued beyond the inflammatory stage, otherwise functional photophobia is likely to result. Persistent and troublesome vomiting, observed sometimes in the late stage, is said to be undoubtedly neurotic in origin.

REFERENCE.—¹*Brit. Med. Jour.* 1918, ii, 138.

GASTRIC ULCER. (See GASTRO-ENTEROSTOMY; STOMACH.)**GASTRO-ENTEROSTOMY, MEDICAL ASPECT OF.***Robert Hutchison, M.D., F.R.C.P.*

Carter¹ is of opinion that all cases of chronic gastric and duodenal ulcer should be given the chance of a thorough medical 'cure' before being submitted to operation, and that, after operation, they should again come under the care of the physician for careful dieting. He attributes many failures after operation to neglect of the latter precaution. As regards statistical results of medical and surgical treatment respectively, he considers that fully 20 per cent are permanently cured by medical means, whilst collected surgical statistics show about 64 per cent of cures.

The indications for operation are: (1) Chronicity of symptoms in spite of medical treatment; (2) Repeated or severe hæmorrhage; (3) Pyloric stenosis. It is more necessary to operate in the case of a chronic gastric than of a duodenal ulcer, because of the risk of cancer developing in the former, an occurrence which rarely, if ever, takes place in duodenal ulcer. Hæmorrhage is fortunately rarely fatal, but if it has been severe it is wise to operate as soon as the patient has made up enough blood—say in about two weeks—to prevent recurrence. If immediate operation is necessary, transfusion should be performed first. As regards pyloric stenosis as an indication for operation, all authorities are agreed.

He considers the results of operation on (1) Symptoms; (2) Secretion; (3) Motility.

1. The immediate effect on symptoms is usually favourable.

2. The change in secretions is often insignificant, and in general it may be said that the acid values shown by gastric analysis are all somewhat lowered; but the case that was hyperacid before operation is apt to remain hyperacid to the end of the chapter, and particularly in the few weeks following operation, although the acid values are less; the cases with normal pre-operative acidity are seen to have this more or less reduced, but often show little change; again, some cases promptly swing clear through to an achylia. Hypersecretion, either continuous or alimentary, is regularly a part of most operations

on the digestive tract, but after this post-operative effect has passed, certain cases remain with a hypersecretion, in some instances simply a continuance or increase of pre-operative hypersecretion, in others occurring for the first time only after operation. Operation on a stomach with normal secretions and motility often results (a) "In stasis or hypersecretion, or both (particularly with an occluded pylorus); and (b) Operative treatment on a stomach with delayed motility and hypersecretion usually brings motility to normal and lowers acidity."

The modification of the symptoms and secretions is undoubtedly due to: (a) The relief of the pylorospasm which follows the operation; (b) The inflowing of alkaline jejunal contents; (c) Lessened emptying time of the stomach provided the pylorus has not been occluded.

3. When we come to investigate gastric motility immediately after operation, we find several factors at work. If the patient is generally weak and miserable there will undoubtedly be atony and delayed emptying, and this is particularly true if the pylorus has been occluded. If, on the other hand, vigor is fairly promptly restored and the pylorus is patent, so providing two ways of exit for the chyme, the gastric motility is better and the emptying time shortened to less than normal. In fact, in these cases it is often difficult to get a test meal, as the stomach frequently empties in twenty to thirty minutes. One thing must be kept in mind, namely, that practically nothing leaves through the gastro-enterostomy opening unless it is directly pushed through by the gastric muscle; the opening does not act like a bung-hole in a barrel. The presence of an accompanying gastroparesis usually aids in prolonging discomfort and emptying time as well as in keeping the acidity at a fairly high level.

Still another immediate effect noted is the change in the character of the stools, which for some weeks after operation are apt to be unduly copious in comparison with the meals eaten. This, as will be shown in the metabolism of these cases, is probably due to poor fat absorption in the early post-operative days.

Remote Results of Gastro-enterostomy.—In studying the remote results (after six months) one must take into consideration (1) the mild or short cases, and (2) the severe or long cases. The former will settle down to their new normal of health and permanent relief sooner than the latter. In regard to the late effects on (1) symptoms, (2) secretion, (3) motility, and (4) longevity, it is possible to say that the relief of symptoms is permanent provided no complications exist and the ulcer heals. The secretions gradually settle down to their new normal, showing lower acid values than before or immediately following operation, but again often showing insignificant changes. It is among the late results that we do see occasional cases of achylia which before operation were hyperacid and showed hypersecretion; but in the main the secretory changes are much less than was formerly supposed. What the rule is that governs these changes in secretion,—one case remaining hyperacid, another showing normal acidity, and still another achylia, when they were possibly all hyperacid before operation,—is entirely unknown, but these irregular and apparently unaccountable results do occur. The late results in motility are the same as the early results when there is no atony, namely, early emptying time when both pylorus and gastro-enterostomy are patent, normal or even delayed emptying time where the pylorus is occluded. The operation of gastro-enterostomy has not yet been long enough in use to enable one to form a definite opinion as to its effect on longevity, but there is no reason to suppose that patients who have been subjected to it live shorter than other people, and there are cases on record of perfect health twenty years after the operation. Metabolism investigations also show a perfect utilization of food by such persons, although

in the first few months after operation there may be an imperfect absorption of fats.

Wilensky and Crohn² have made a careful study of thirty-seven cases of gastro-enterostomy for chronic gastric or duodenal ulcer, by means of *x* rays, test meals, etc. In all of these cases the ulcer had been excluded by the string method, or by pyloric plication, or had been excised. They conclude that in nearly all cases the operation leaves the stomach definitely impaired in its functions, but are unable to estimate how large a part pyloric exclusion plays in this disturbance. They advise that operation should not be undertaken unless a definite organic lesion can be demonstrated, as it is in cases which show no lesion that the greatest disturbance of function follows operation.

(See also STOMACH, ULCER OF.)

REFERENCES.—¹*Amer. Jour. Med. Sci.* 1917, ii, 851; ²*Abstr. in Surg. Gyn. and Obst.* 1917, ii, 333.

GENERAL PARALYSIS. (See SYPHILIS OF NERVOUS SYSTEM.)

GENITAL PROLAPSE.

W. E. Fothergill, M.D.

D. R. Ayres¹ makes interesting observations on the results of the interposition operation. He says that of 37 cases which happen to have come under his care, only 16 were free from undesirable symptoms. There were 9 cases of cystitis, in which cystoscopic examination showed elevation of the base of the bladder, with deep pockets on either side and behind the trigone. Of all the cases examined, only 2 did not have cystitis that showed this distortion. Of the 9 cases, only 1 gave a history of bladder trouble before the operation. There were 3 cases of incontinence of urine. In 2 cases the fundus of the uterus bulged outside the vagina. In 2 cases there was recurrence of the prolapse, and in another there was cystocele. Stone in the bladder was found on 3 occasions. A frequent complaint was dyspareunia due to shortening the vagina. The writer still thinks the operation is suitable for certain cases. [He is evidently not aware that it is as unnecessary as it is objectionable. There has been a great output of papers on genital prolapse during the past year, most of them suggesting freak operations.—W. E. F.] (See also MEDICAL ANNUAL, 1917, p. 248.)

REFERENCE.—¹*Amer. Jour. Obst.* 1917, Sept., 451.

GERMAN MEASLES. (See RUBELLA.)

GLANDERS.

J. D. Rolleston, M.D.

According to Marcuse,¹ glanders was a rare disease in Germany in peace times, but the war with Russia, in which the disease was prevalent, rendered the introduction of glanders into Germany probable unless special precautions were taken. Marcuse recommends that no operation or necropsy on a case of glanders in man or horse be undertaken without surgical overalls and rubber gloves. The hands and forearms should be carefully disinfected before, during, and after the operation, and the smallest crack on the skin should be treated with zinc chloride, fuming nitric acid, or the thermo-cautery.

Linck² records two rapidly fatal cases of glanders, in one of which the diagnosis first of typhoid fever and then of acute osteomyelitis was made, while the second was regarded as a case of small-pox. The true nature of the disease in each case was not revealed until a bacteriological examination was made at the necropsy. The source of infection was not determined in either case.

REFERENCES.—¹*Berl. klin. Woch.* 1917, 185; ²*Med. Klin.* 1917, 959.

GLAUCOMA.*R. Foster Moore, F.R.C.S.*

Sclerocorneal Trephining for Hypertony.—J. Gray Clegg¹ describes his technique and his experiences gained from 250 operations. The following are the chief points brought out. A large conjunctival flap and a 2-mm. trephine, are recommended. If a knuckle of iris protrudes, an iridectomy is performed, care being taken to avoid traction upon the iris. Among 209 patients operated upon, 130 were between the ages of fifty and seventy, and among 251 cases, 186 were chronic glaucoma, 23 acute glaucoma, and 22 subacute. Trephining is considered far superior to iridectomy for hæmorrhagic glaucoma, on account of the less liability to intra-ocular hæmorrhage. The operation was performed in one case of advanced retinitis pigmentosa without benefit. There appear to be two cases only in which, after operation, there was deterioration of vision which could be ascribed to progressive optic atrophy. The visual fields were for the most part much the same after operation as before. In five cases the eyes were subsequently removed; in 1 per cent panophthalmitis occurred. The author thinks that trephining should be resorted to as soon as possible after a definite diagnosis has been made. The following is a *résumé* of the results obtained by operation:—

Acute glaucoma	..	Improved	..	70 per cent.
"	"	Stationary	..	25 "
"	"	Worse	..	5 "
Subacute glaucoma	..	Improved	..	47 "
"	"	Stationary	..	42 "
"	"	Worse	..	11 "
Chronic glaucoma	..	Improved	..	32 "
"	"	Stationary	..	48 "
"	"	Worse	..	20 "

Thrombosis of the Central Vein with Glaucoma.—M. S. Mayou² believes that the presence of new vessels on the surface of the iris, when associated with glaucoma, is pathognomonic of thrombosis of the central retinal vein, and is consequently a contra-indication to operative treatment. He has collected 23 eyes showing these vessels during the last eight years at the Central London Ophthalmic Hospital. In no case of thrombosis without some increased tension were they present. They were traced to the ciliary circulation by means of serial sections.

Glaucoma in Young Persons.—Carl Haag³ has made a study of 67 cases of glaucoma in persons less than 35 years of age. Some of his conclusions are as follows: The frequency of glaucoma in young persons is similar in both sexes, and increases with age; accompanying disturbances of nutrition are frequent; amongst the cases examined, inflammatory glaucoma was twice as frequent as the simple variety; myopia was more frequent than hypermetropia, and in the former simple glaucoma was more common; hereditary influences are apparently no more frequent in juvenile than in adult glaucoma.

REFERENCES.—¹*Brit. Jour. Ophth.* 1917, Sept., 532; ²*Ibid.* 1918, Oc 521; ³*Klin. Monatsbl. f. Augenheilk.* 1915, Feb.-March, 133 (abstr. *Brit. Jour. Ophth.* 1918, March, 159).

GONORRHOEA.*C. F. Marshall, M.D., F.R.C.S.*

DIAGNOSIS.—The Medical Research Committee, in a Special Report on the Laboratory Diagnosis of Gonococcal Infections,¹ issue the following recommendations. The diagnosis of gonococci in *film preparations* cannot be based on the presence or absence of intracellular diplococci, even of characteristic shape, for two reasons: (1) The gonococci may be extracellular both in acute and chronic gonorrhoea; (2) Other organisms in the genito-urinary passages may be intracellular. The only reliable method is that of Gram, the gonococcus

being Gram-negative, and most micro-organisms with which it may be confused Gram-positive. The original method of Gram is liable to many errors: (1) If the film is too thick, decolorization is difficult and some Gram-negative organisms may retain the stain; (2) If the film is overheated when drying, doubtful results are obtained; (3) If the anilin-water-gentian-violet is not fresh it does not give a differential stain; (4) The same applies to the iodine solution; (5) If the alcohol is not absolute, it will decolorize Gram-positive organisms; (6) Gram-positive organisms may be decolorized and appear to be Gram-negative if the counterstain is too concentrated or if it is made in a weak alcoholic solution. The chief source of error, the unstable anilin-water-gentian-violet combination, may be obviated by using carbolio-acid-gentian-violet; but the method recommended by the Committee is that of Jensen, in which the gentian-violet is replaced by a 0.5 per cent aqueous solution of methyl violet, the iodine solution is increased in strength (iodine 1 part, potassium iodide 2 parts, distilled water 100 parts), and the counterstain is neutral red. The diagnostic limitations of Gram's stain are: (1) Gram-positive organisms when digested by leucocytes may lose their character; (2) The method does not distinguish between gonococci and other Gram-negative but non-pathogenic diplococci. These limitations, however, do not seriously affect the diagnosis in acute gonorrhœa. As regards media for culture of the *gonococcus*, David Thompson has shown that the following media are satisfactory: (1) Thompson's human-plasma-glucose-agar; (2) Cole's tryptic blood-agar; (3) Gordon and Hine's trypsinized pea-extract-agar. The production of a focal gonococcal reaction by inoculation with gonococcal vaccine, as a means of detecting latent gonorrhœa, is considered dangerous on account of the possibility of lighting up a latent iritis or salpingitis.

As regards the complement fixation test for gonorrhœa, while it cannot replace other methods of diagnosis, it may in some cases be the only laboratory means of diagnosis. It is most likely to be useful in cases of metastatic infection, where direct demonstration of the gonococcus may be difficult or impossible, and it is such cases which give the highest proportion of positive results. The limitations of the test are as follows: (1) Acute gonorrhœa gives no reaction for three or four weeks, as sufficient antibodies are not formed till then; (2) Chronic cases may give negative results when the disease is narrowly localized; (3) In women no reaction is obtained till the disease has spread to the uterus; (4) It is useless in cases receiving vaccines, as the blood in such cases may continue to give the reaction for four months; (5) Immunization experiments on animals have shown that positive reactions may be obtained for several weeks after complete cure. The Committee recommend the provision of an official standardized polyvalent antigen, but do not recommend any one standard method of technique. The details of three methods (Schwartz and McNeil, Kolmer, and Thomson) are given in an appendix.

TREATMENT.—The Surg.-General of the U.S.A. Army, by an Advisory Committee,² recommends the following treatment. In acute urethritis rest in bed is considered important. Alkaline drinks should be avoided, as an acid urine is a safeguard against cystitis. Sandalwood Oil is indicated in the acute stage, Copaiba and Cubebs only in the declining stage. Except in very acute cases, local treatment should begin at once. This may be performed (1) by injections of Protargol 0.5 to 2 per cent, or Argylol 2 to 4 per cent, given three or four times daily, and retained for five to ten minutes; (2) by irrigations of protargol or argylol, 1-1000, or permanganate of potassium 1-3000, given as hot as can be borne four times in twenty-four hours. Of the two methods, irrigation is preferred. In the declining stage, injections, of argylol or protargol should be alternated with astringent injections of Zinc Sulphate or Zinc

Permanganate, etc. When the urine is free from pus, a provocative injection of 1-4000 Silver Nitrate is advised; if gonococci are present, a purulent discharge is caused, and requires treatment as for acute urethritis. If no such discharge appears, but the urine still contains filaments, the urethra should be massaged gently over a large sound, not oftener than every five days, followed by irrigation with 1-10,000 Silver Nitrate. This should be continued till filaments disappear. Daily irrigation with Potassium Permanganate is also useful at this stage. Five or six weeks of the above treatment is sufficient for most cases of anterior urethritis.

Posterior urethritis is not infrequently due to too vigorous local treatment. Sandalwood Oil is useful in acute cases, but alkalies are contra-indicated. Subacute posterior urethritis may be treated: (1) By instillation of ten drops of 1-500 to 1-100 Nitrate of Silver through a rubber catheter; (2) By irrigation with 1-1000 to 1-250 Protargol, 1-10,000 Silver Nitrate, or 1-3000 Permanganate of Potassium, by the gravity irrigator or a large syringe. Irrigations are preferable when there is a copious discharge, instillations when only filaments remain. If epididymitis occurs, all urethral treatment should be stopped, and only resumed with caution. In chronic prostatic gonorrhœa, **Massage of the Prostate**, two or three times weekly is advocated, and in order to lessen the danger of epididymitis from this procedure it is advisable to irrigate the urethra and fill the bladder before massage. The posterior urethritis which is usually present also requires treatment by silver nitrate instillations. The verumontanum, which is affected in most cases of chronic prostatitis, is best treated through the urethroscope with 20 per cent Silver Nitrate or Tincture of Iodine. Chronic seminal vesiculitis is treated with massage except when there is much tenderness, or if blood is present in the expressed matter.

Gougerot³ has found the treatment of gonorrhœa by large doses of Sandalwood Oil, introduced by Vidal, useful in military practice. This is given in 1-grm. capsules five or six times daily for fifteen or twenty days; after this the daily dose is reduced to 4 grms. till the twenty-fifth day, then 3 grms. till the thirtieth day, and 2 grms. till the fortieth day. Local treatment is not considered essential. Recovery is said to be frequent after ten days' treatment, but this should be continued after apparent cure. According to Vidal, the oil has a specific action, and is more effective in recent infections; but it may be also used in chronic gonorrhœa in daily doses of 6 or 7 grms. for a week with weekly intervals, and supplemented by local treatment. Said to be effective in gonorrhœal orchitis, cystitis, arthritis, and ophthalmia, and as a prophylactic.

Lacombe⁴ recommends treatment of gonorrhœal urethritis by Sulphurous Anhydride Gas produced by two solutions: (1) Containing 6 grms. of picric acid in 1000 c.c. of water; (2) 17 grms. of hyposulphite of sodium in 1000 c.c. of water. Each solution is warmed to 37° C. In acute urethritis the urethra is injected with 5 c.c. of a mixture of four parts of the first solution with one of the second. Picrate of sodium is produced and sulphurous anhydride gas liberated. The sulphurous anhydride gas liberated is said to exert pressure and bactericidal action on the walls of the urethra, extending to the glandular diverticula, which liquids cannot reach. In the early stage of gonorrhœa the proportion of the two solutions is four of the first to one of the second; three injections daily. In the second stage, the same for anterior urethritis, but in total urethritis 6 c.c. (4.8 to 1.2), so as to reach the posterior urethra. In the stage of decline and in chronic gonorrhœa, one injection daily of 6 or 5 c.c., according to whether the urethritis is anterior or total. The author reports good results in 130 cases.

Cobbledick⁵ points out the frequency of *latent prostatic gonorrhœa* as a cause of obscure cases of rheumatism, and more especially of *iridocyclitis*. He states that in a series of nine cases of 'rheumatic iridocyclitis' the gonococcus was found in the genito-urinary tract in all, after periods varying from seven to thirty years from date of last infection. He mentions cases which support the view that the prostate or vesiculæ may be the seat of gonorrhœal infection for many years when the rest of the genito-urinary system is unaffected. Hence the importance of an examination of the urine passed after massage of the prostate. The deposit obtained by centrifugation should be examined for gonococci at once, as in a few hours the threads and their contained gonococci become disintegrated by the action of the urine.

McDonagh⁶ reports good results with intramuscular injections of *Colloidal Manganese and Antimony*. By this means the average stay in hospital is stated to have been reduced from forty-nine to twelve days. In this scheme of treatment five injections of manganese are given at intervals of two or three days in doses of 1 c.c., increased to 2.5 c.c. If the discharge persists, potassium iodide or *Colloidal Iodine*, 3 dr. thrice daily, are given, and also injections of *Colloidal Antimony* on the eighteenth and twenty-second days, in the dose of 1.5 c.c. of a 0.04 per cent emulsion. Manganese is said to act on the staphylococci, which often complicate gonorrhœa. It is given as an adjunct to local treatment, and does not contra-indicate vaccines. In epididymitis 2 to 4 c.c. of manganese may be given in the early stage, 1.5 to 2 c.c. in the florid stage. In gonorrhœal arthritis, if urethritis is present, four injections of Manganese, 1.5 to 4 c.c., at intervals of three days, and two injections of *Intramine*, 2.5 c.c., are recommended; if the discharge has ceased or is slight, two injections of intramine and one of manganese at intervals of three days. Intramine is said to reduce pain and swelling of the joints. It may also be used locally as an injection in gleet. An intravenous injection of 100 c.c. of *Colloidal Iodine* is also recommended, and a local dressing of the same.

More recently McDonagh⁷ precedes the injection of manganese with two injections of 0.5 c.c. *Colloidal Palladium*, which, he says, hastens the oxidizing action of the manganese. Local treatment by potassium permanganate irrigations, followed by zinc permanganate when the discharge ceases to be purulent, is carried out at the same time. The average duration of this treatment in 50 cases was eight and a half days. One relapsed, one developed epididymitis, and two prostatitis.

Haworth⁸ has had good results from *Sensitized Vaccines*, which have the advantage of being less toxic and can be pushed without causing local or general reaction. In his first case an autogenous sensitized vaccine was prepared; improvement took place after failure of an ordinary autogenous vaccine, and also of a stock mixed gonococcal and staphylococcal vaccine. Afterwards he used a stock sensitized vaccine made from several strains of gonococci. The initial dose was 100 million, and this was gradually increased to a maximum of 2000 million, given at intervals of four days. In 16 out of 17 cases of gonorrhœal arthritis the treatment is said to have been successful.

REFERENCES.—¹*Med. Res. Com.* Special Report, Series No. 19; ²*Jour. Amer. Med. Assoc.* 1917, ii, 1169, 1259; ³*Jour. des Prat.* 1918, June 1; ⁴*Presse Méd.* 1918, Jan. 3; ⁵*Lancet*, 1918, i, 335; ⁶*Pract.* 1918, May; ⁷*Brit. Med. Jour.* 1918, ii, 31; ⁸*Ibid.* 1918, i, 4.

GRAFTING OF TISSUES. (See BONE AND CARTILAGE GRAFTING; SKIN GRAFTING; ORTHOPÆDIC SURGERY.)

GRANULOMA VENEREUM.

E. Graham Little, M.D., F.R.C.P.

This disease would seem to be especially common in Brazil, for Aragão¹ speaks of fifty cases having been treated there with tartar emetic. It occurs almost exclusively in dark races, but is occasionally met with in Europeans, and its characteristic clinical features are the torpid ulcerations of the genitals, proving very intractable to treatment. Very striking bacterial forms, known as Donovan's bodies, have been demonstrated to be the cause; these are small round or ovoid cocci, which may develop into rod-like or dumb-bell shapes, usually with capsule, but in the cells, where they are chiefly found, often without this envelope. Aragao grew cultures on most of the usual laboratory media, on which the organism showed characters very like those of Friedländer's bacterium. Inoculations from the cultures were fatal to guinea-pigs and rabbits within twenty-four hours, with symptoms of septicaemia, but inoculations from the tissues themselves were harmless to animals. The most effective treatment was found to be the intravenous injection of a 1 per cent solution of Tartar Emetic, in doses of 10 to 12 c.c., given in series of twelve doses, the series being repeated when necessary, and continued for some time after healing has resulted. X rays form a valuable adjuvant to the treatment.

Pijper² reports a case occurring in a Kaffir who had contracted the disease from a Kaffir woman in Johannesburg. Donovan bodies were found in the tissues, but all cultures were negative.

[It is probable that some at least of the cases reported under this head are examples of the little recognized and quite different affection, *ulcus molle serpinosum*, described and figured in last year's ANNUAL. The principal clinical differentiation lies in the almost universal initial bubo prior to the ulceration which distinguishes *ulcus molle*, in which, moreover, ulceration and not tumour formation is the chief symptom.—E. G. L.]

Curjel³ contributes a personal experience of twenty cases of this disease occurring in native women, an experience which forms an interesting addition to knowledge, as the recorded cases have been chiefly male. The incidence of this disease in the cases here recorded was always in the external genitals, a distribution which suggests a venereal origin. The average age of the women was twenty-five, and the general health otherwise was good. The average duration of the ulceration was three and a half years. The ulceration may spread for a short distance up the vaginal tract, but the mucosa is less affected than the skin and subcutaneous tissues. The inguinal glands in the female, as contrasted with the experience in the male, are usually enlarged, this difference being explained by the existence of secondary infections of the vagina. Cleanliness made a considerable difference in the severity of the symptoms. The disease spreads eccentrically, the advancing edge consisting of small nodular growths, the size of a pea. Auto-infection of apposed surfaces is common, and there is a special predilection for moist surfaces, so that the fold of the thigh and the inter-natal sulcus are commonly involved. Healing is followed by the formation of dense scar tissue. The histological appearances are those of a chronic inflammatory process. Sterility is an almost invariable result. The treatment adopted in all the cases included rest in bed, washing the parts twice daily with a disinfectant, and powdering with a mixture of Boric Acid and Iodoform. Subsequent measures should include either X-ray applications or free Excision of the affected parts.

Pardo⁴ describes two cases, one in a native Cuban woman, the other in a male European. The essential clinical features are the slow ulceration of the genitals, beginning with a small moist papule, and unconnected with syphilis, soft sore, or gonorrhœa, though it also is usually venereal in origin.

Salvarsan and local antiseptic dressings were tried with little effect, but speedy improvement resulted after intravenous injections of 5 c.c. of a 1 per cent solution of Potassium and Antimonium Tartrate, given every two days. In one of the cases a short capsulated bacillus, such as was described by Donovan, was isolated.

REFERENCES.—¹*New Orleans Med. and Surg. Jour.* 1917, Oct., 369-74; ²*S. Afric. Med. Rec.* 1918, 20-6; ³*Ind. Med. Gaz.* 1917, 305; ⁴*Jour. Cutan. Dis.* 1918, April, 208.

HÆMORRHOIDS. (See RECTUM AND ANUS.)

HÆMOTHORAX. (See THORAX.)

HALLUX VALGUS. (See FOOT, DEFORMITIES OF.)

HEAD, SURGERY OF.

J. Ramsay Hunt, M.D.

Pulse-rate and Blood-pressure in the Treatment of Head Traumas.—The importance of the blood-pressure, pulse-rate, and respiration in relation to cerebral compression has long been recognized, and cannot be too often emphasized. Sieber¹ has recorded some interesting observations relating thereto:—

It is a recognized clinical fact that a rapid encroachment upon the intracranial space by any foreign body is frequently associated with a slow, high-tension pulse. This phenomenon has been an almost uniform accompaniment of artificially produced cerebral compression in the laboratory experience of many investigators.

As the brain tissue is practically incompressible and is enclosed in a non-expandable skull-box, the introduction of an intracranial foreign body is only possible through the emptying of the surrounding vascular channels.

In 1902, Cushing produced experimentally, in dogs, a general cerebral compression, by allowing normal salt solution, warmed to body temperature, to enter the cranial space through a cannula screwed into a trephine opening in the arch of the atlas. When the pressure of the fluid in the intracranial space was allowed to increase, there was first noted a distinct evidence of venous stasis, with bluing of the exposed convolution and, later, a narrowing of the longitudinal sinus. As the intracranial tension approximated the arterial pressure, a condition of anæmia was produced, as shown by the blanching of the cortex; the veins remained filled with blood, and very little if any circulation was evidenced. As the pressure produced is a general one, a similar anæmia is present in the medulla, where the vital centres are poorly nourished, if at all. This anæmia of the medulla stimulates the vagus centre, slowing the pulse, and likewise the vasomotor centre, resulting in an increase in the general arterial pressure to a point above that of the high tension in the intracranial space. The pale cortex becomes pink, and the respirations, which are very irregular, or perhaps have ceased entirely, are again resumed as a result of the return of blood to the respiratory centre. If, after this readjustment of circulation has taken place, the intracranial pressure is again increased to a point above that of the arterial pressure, anæmia is again produced and the blood-pressure once more rises, in its turn, to the point of exceeding the intracranial tension. Thus the process may be continued until the arterial pressure is raised to a point two or three times its normal level, in an attempt to exceed the intracranial pressure and supply normal nutrition to the bulbar centres. With the continued increase of the intracranial tension, sooner or later a time comes when the vasomotor centre weakens and is no longer able to supply sufficient blood to the medulla. The blood-pressure falls below that of the intracranial tension, and the animal dies with a low blood-pressure and rapid

pulse, which may continue for some time after the respiration has ceased, a typical respiratory death.

Cushing's experiments, therefore, tend to show that if tension in the intracranial space is rapidly increased, there is produced an anæmia of the brain and medulla. As a result of the approaching medullary anæmia, there is a physiological response represented by a rise in arterial pressure to a point above that of the intracranial tension. In this way a fatal medullary anæmia, which otherwise would be the result of an equalization of the intracranial and arterial pressure, is warded off. The mechanism of this response is attributed to the vasomotor control of the large splanchnic area, which holds the arterial pressure slightly above that in the intracranial space. With exhaustion of the vasomotor mechanism, there is an equalization of the intracranial and arterial pressures, following which there is a fall in blood-pressure and respiratory failure in consequence of the resulting bulbar anæmia.

During the past five years, in all head injuries we have followed very closely the pulse-rate, respiration, and arterial pressure, as well as the other symptoms. In many instances there has been a striking similarity between the symptoms preceding death in cases of fracture and those produced in animals by increasing intracranial pressure to the point of cerebral anæmia.

The mortality in fractures of the skull treated by the time-honoured expectant method is very high. We believe that frequently death is the result of medullary compression and œdema, and that the degree of encroachment upon the vital centres may be ascertained by frequent observations of the pulse-rate and blood-pressure. In such cases early relief of pressure is advisable, not only to save life, but to lessen the danger of numerous nervous disturbances so frequently seen following fractures of the skull. Not all cases have an associated intracranial tension great enough to produce medullary compression. In some there is sufficient escape of blood and cerebrospinal fluid through a line of fracture to relieve an otherwise fatal compression. These cases do not show the high-tension slow pulse so characteristic of approaching medullary compression, and so operative interference is neither necessary nor advisable. In other cases, the associated laceration or contusion of the brain may be so extensive that a relief of pressure not only fails to avert a fatal outcome, but is an added shock, usually hastening death. There is a group of cases mid-way between these mild and severe types, in which there occurs a progressive increase of intracranial pressure. Unless there is early relief of the tension a fatal outcome is a certainty. We believe that with care this group of cases may be properly differentiated by frequent blood-pressure and pulse-rate observations. From these observations one may not only determine the degree of cerebral compression, but they may be utilized as an indication for or against the necessity of operation.

Some observers advise daily lumbar punctures for relief of pressure in fractures of the skull, and report a decrease in the mortality as a result of this procedure. We have made very little use of lumbar puncture therapeutically, but employ it more as a diagnostic aid. We have frequently observed little or no increase in the pressure of the fluid within the spinal sac, but in the same case an enormous increase of intracranial fluid was found at time of operation. These findings may be explained by a dislocation downward of the brain, blocking the foramen magnum and shutting off the spinal fluid from the effects of tension existent within the cranial cavity.

Sieber has studied 76 cases of fracture of the skull from this point of view. Special emphasis was laid upon the pulse-rate and arterial pressure in this group as speaking for or against decompressive measures. As a result of his observations the following conclusions are reached :—

After the dangerous stage of advanced medullary compression has been reached, or in cases when injury to brain tissue is extensive, there is little, if any, advantage obtained by a decompression operation. We are inclined to believe that many of the cases operated upon in this group, if seen to-day, would not be subjected to the added shock of a decompression.

Summary.—1. A rapid encroachment upon the intracranial space by any foreign body produces anæmia of the brain and medulla, and is associated with a physiological response represented by an increase in the general arterial pressure and decrease in pulse-rate.

2. The associated intracranial complications are the dangerous factors in fractures of the skull.

3. When the degree of intracranial pressure equals or exceeds the arterial pressure, death results.

4. Frequent blood-pressure and pulse-rate observations not only determine the degree of intracranial pressure, but may be utilized as indications for or against the advisability of relieving the pressure.

5. Intracranial pressure should be relieved before the advanced stage of medullary compression and œdema is produced.

6. The subtemporal decompression is the advisable method for relief of intracranial pressure.

7. By frequent blood-pressure and pulse-rate observations, fractures of the skull may be divided into three groups: (a) Those cases which at no time show any evidence of intracranial pressure; (b) Cases presenting signs of a definite increase of intracranial pressure; (c) Cases presenting signs of advanced medullary compression or in which there is evidence of severe laceration or contusion of the brain.

Intradural Operation for the Removal of Hypophyseal Tumours.—The first successful hypophyseal operation was performed by Schloffer in 1907 through the extracranial trans-sphenoidal approach. Several modifications of this technique have been made by Hirsch, von Eiselsberg, Cushing, Kanavel, and others. In 1893 the subtemporal operation by the intracranial method was done by Thus, Caton and Paul. Krause, in 1905, and Hartley and Kiliani in 1904, attempted to expose the hypophysis by bilateral osteoplastic frontal resection and ligation of the longitudinal sinus. Kiliani suggested opening the dura as soon as the osteoplastic flap was removed. Frazier, in 1913, described the transfrontal approach, which differed from the technique of McArthur in that the osteoplastic flap was turned in conjunction with the resection of the roof of the orbit. In both the McArthur and the Frazier operations the dura was raised with the frontal lobe and not opened until the anterior clinoid process was approached. A. W. Adson² describes the technique of an *intradural method of approach*, and reports the operative results in six cases. In two of the group of six cases, the patients presented very definite bitemporal hemianopia, with more or less complete loss of vision in the left eye. One patient had a complete loss of vision in the right eye for a period of ten years, and a left temporal hemianopia; one presented a typical acromegalic syndrome, with a temporal colour hemianopia and constricted object field; one had bitemporal hemianopia with more or less distorted fields in the left eye; and one had blindness in the right eye with definite neighbourhood symptoms producing a frontal lobe syndrome of pressure and localization, involving the uncinate gyrus. Post-operative convalescence was uneventful and rapid in all but one case, in which the patient died on the second day. In two cases there was complete restoration of vision, in two marked improvement in vision, and in one a relief from headache. In the case of blindness in the right eye which was complete for ten years, the patient has begun to have a return of vision.

The patient with acromegaly is having metabolic changes. In five cases there has been definite improvement. In one, no visual improvement, but relief from pain was obtained.

The particular advantages of the operation are: (1) Its approach presents a dry field, free from infection, and in which it is comparatively easy to expose the optic commissure and the tumour; (2) The exposure permits the dissection of the tumour from the optic nerves and the commissure, and removal of all or any portion of the tumour and pituitary body that is desired; (3) Trauma of the commissure and nerves is prevented, as the sponging is done against the floor of the sella instead of working upward against the commissure and nerve peduncles. So far as the operative risk is concerned, it is no greater than in craniotomies on the frontal lobe, depending a great deal, no doubt, on the experience of the operator.

Meningeal Hæmorrhage.—G. Guillain³ emphasizes the great importance of meningeal hæmorrhage in the cranial injuries of war. Spontaneous hæmorrhage into the meninges is encountered in military practice as in civil life. It results from rupture of an artery which had been previously diseased by syphilis or an infective arteritis. Perhaps the emotional and physical strains incident to war are powerful predisposing factors. The gravity of meningeal hæmorrhage is dependent not only upon the size of the effusion, but also upon the absorption of toxic products the result of the hæmolysis of the effused blood.

In penetrating wounds of the skull, Guillain believes that the initial coma and shock are frequently referable to the meningeal effusion. In such cases he warns against the too liberal use of lumbar puncture and anaesthetics which elevate blood-pressure, thus increasing the tendency to bleed. Meningeal hæmorrhage may also follow simple scalp wounds and contusions from the projectiles of war. In such cases the early use of lumbar puncture may seem to make the diagnosis clear and thus explain the subsequent symptoms, e.g., mental confusion, amnesia, headache, and asthenia. The spinal fluid in such cases is often of a rosy tint, or at a later stage shows xanthochromia. He also refers to the effects of high explosives without evidence of external injury, and the sudden changes in atmospheric pressure of the aviator, as causes of meningeal hæmorrhage, explaining sudden death and the serious cerebral complications of such accidents.

Among the diagnostic features he mentions headache, rigidity of the neck, Kernig's sign, hyperæsthesia, and bradycardia. There is mental confusion or coma. The tendon reflexes are exaggerated, the pupils dilated and unequal, and frequently there is hyperthermia. This latter symptom is to be referred to the compressive effects of the hæmorrhage or the toxic effects of the hæmolysis. This toxæmia he considers of great importance, and there is sometimes noted a characteristic slight icteric tint of the skin, the result of the absorption of broken-down products of the blood. Massive albuminuria is sometimes noted. In all cranial injuries of war the question of meningeal hæmorrhage should be seriously considered.

REFERENCES.—¹*Ann. Surg.* 1918, Jan., 51; ²*Jour. Amer. Med. Assoc.* 1918, 721; ³*Presse Méd.* 1918, 449.

W. I. de C. Wheeler, F.R.C.S.I.

Nichols¹ discusses the indications for operation on traumatic head cases. He states that œdema of the brain produces symptoms like concussion. The symptoms are produced by a blow of moderate severity. Probably vasomotor disturbance of the brain-vessels is produced, serum escapes from unruptured vessels, and pressure occurs. There is very often mental confusion and loss of memory of preceding events. These cases do not need operative treatment.

Slight laceration of the brain occurs uncomplicated by fracture. In these

cases, which closely resemble concussion and œdema, blood is found in the spinal fluid, and the temperature is elevated (101° – 102°). Operation is usually unnecessary.

Cases of intracranial hæmorrhage (extracerebral) are accompanied by focal symptoms, dependent upon the amount, location, and rate of onset of the hæmorrhage. In slight cases there is a rupture of small vessels. The symptoms are those of œdema, together with slight focal paralysis, e.g., paralysis of speech centre if the blow is over the left side in right-handed people, or slight paresis of the limbs of the opposite side. As regards treatment, each case must be judged on its merits; and when in doubt, the skull should be opened and the clot removed, to avoid possible late epilepsy. In severe cases of extracerebral hæmorrhage from rupture of the middle meningeal artery or a vessel in the dura, if paralysis occurs, it generally commences in the face. The blood-pressure in these cases is always high and increasing. These are all operative cases. Severe hæmorrhage occurs without focal symptoms, and such cases are very difficult to diagnose, as they simulate severe concussions. The symptoms of most value are the high blood-pressure, constantly rising, and free blood in the spinal fluid, with no escape of blood from nose, mouth, or ears. Operation upon these cases is fairly successful, but in cases of basilar hæmorrhage is often disastrous.

The author comes to the following conclusions:—

1. Uncomplicated œdema of the brain almost never requires operation.
2. Slight laceration of the brain with persisting œdema sometimes requires operation to prevent cerebral degeneration. The subtemporal method is the best operation.
3. Slight extracerebral hæmorrhage seldom requires operation; it occasionally demands operation to avoid cyst-formation; the operation of choice is always skin-bone-flap.
4. Extensive extracerebral hæmorrhage, from rupture of the middle meningeal artery, with or without focal symptoms, *always* should be operated on, and always by skin-bone-flap method.
5. Basilar hæmorrhage seldom can be cured by operation. When operation is done, it should be on selected cases, for relief of pressure, and usually by skin-bone-flap method.
6. Intracerebral hæmorrhage cannot be cured by operation, although pressure may be relieved.
7. Fracture of the skull, by itself, is of little importance except when compound, when it may produce meningitis unless made aseptic. All depressed fractures involving the entire thickness of the skull should be elevated.

Courtney² draws attention to the value of temperature as a guide in cranio-cerebral traumatism. In intracranial hæmorrhage, with the first shock there is a subnormal temperature, but it soon regains the normal. In uncomplicated contusion, it rises quickly from subnormal often to 102° ; on the morning following the injury it will be about 99° , but rises again that evening to 101° ; next morning it is 97° , and in the evening under 100° ; in favourable cases the evening range gradually narrows to the normal point; the morning temperature is slightly subnormal; in unfavourable cases temperature and pulse rise together, and may reach a very high point. In laceration cases, the temperature goes steadily upwards, even to 104° or 105° in a few hours; early and persistently high temperature denotes brain laceration. Courtney emphasizes the fact that chills during the course of a case of head injury are not indicative of pus-formation; on the other hand, chills are often found in uncomplicated contusion.

HEARING, A NEW THEORY OF.

J. S. Fraser, M.B., F.R.C.S.

The theory of the cochlear mechanism put forward by Wrightson and Keith¹ appears to be a variant of the 'telephone' theory of hearing, i.e., the theory of 'central analysis.' The authors reject Helmholtz's resonance or 'piano' theory, according to which sounds are analyzed in the cochlea itself. In a simple wave there are four distinct phases in each complete cycle, each of which produces a separate impulse on the nerve-endings of the organ of hearing. Sound waves first of all strike the drum membrane and set it in motion. This motion of the drumhead, into which is fixed the handle of the malleus, is conveyed through the incus to the stapes. The malleus and incus together form a bent lever, the long end of which is represented by the handle of the malleus and the short end by the long process of the incus. The leverage has been calculated as a ratio of 3 to 1. The area of the drum membrane is about 20 times that of the footplate of the stapes, and this would give a total increase of effective pressure of 60 to 1—an increase which is transmitted by the stapes to the fluid in the labyrinth. The stapes has not a simple piston action, but rather that of a lever with the hinge near the posterior end of the footplate. The anterior end of the stapes can thus move much more freely than the posterior. The tensor tympani and the stapedius muscles act in opposition to each other, and constitute an elastic balance which tends to bring the ossicles back into a position of rest.

The labyrinth is regarded by Wrightson as a closed box with a piston, represented by the stapes at one end and the membrane of the round window at the other. Any increase of pressure caused by the inward movement of the stapes is transmitted instantaneously throughout all the fluid contents of the labyrinth, and causes a simultaneous outward movement of the membrane of the round window. The cavity of the cochlea is divided into two main cavities by the bony spiral lamina and the basilar membrane. The upper passage, or scala vestibuli, contains the endolymphatic scala media, which is only separated from the perilymph by the thin Reissner's membrane.

When the stapes moves inwards the displacement of the fluid is along the scala vestibuli in the direction of the round window at the foot of the scala tympani. The relative areas of the helicotrema and the basilar membrane are respectively as 1 to 81, so that the liquid displacements will naturally select the shortest route and the line of least resistance to the fenestra rotunda, thus passing by way of the basilar membrane in preference to the helicotrema. The displacements of the fenestra ovalis, Reissnerian and basilar membranes, and the fenestra rotunda are equal, and the internal membranes move as though they formed part of a liquid. Probably little or none of the fluid displacement in the scala vestibuli passes the helicotrema. All parts of the basilar membrane rise and fall to the same extent together. This movement of the basilar membrane causes a side-to-side movement of the top of the arch of Corti, and therefore of the upper surface of the organ from which project the sensory hairs. The membrana tectoria does not participate in this side-to-side movement, and hence the hairs of the organ, which are embedded in it, are subjected to a bending from side to side. Each movement inwards of the footplate of the stapes causes a depression of the basilar membrane, a movement of the Corti arch away from the lamina spiralis and the modiolus, and a bending of the hairs towards the modiolus.

Wrightson assumes that each change of momentum of the fluid, however small, produces a stimulus. Each hair-cell receives four stimuli in each complete cycle of a simple sound-wave. In the first phase, or inward movement of the stapes, the hairs are bent towards the modiolus. In the second phase the stapes is brought back to a state of equilibrium by the elastic resistance

of the tympanic muscles, and the hair returns from its bent position to the upright. In the third phase the stapes moves outwards and the hair is bent away from the modiolus. In the fourth phase the hair again returns to its normal upright position. Thus a series of periodic impulses are sent to the brain in exactly the order and time-relationship in which they were received. They are finally analyzed in the cortex of the brain.

[There appear to be several objections to the theory of the cochlear mechanism put forward by Wrightson and Keith. In the first place, it is well known that in senile or arteriosclerotic deafness there is loss of hearing for the highest tones. Microscopic examination in such cases shows degeneration of Corti's organ and its ganglion cells at the beginning of the basal coil of the cochlea, and it is easy to explain the loss of hearing for the high tones in this way. On the other hand, it appears to be difficult, if not impossible, to explain this peculiar loss of hearing on the theory propounded by the authors. Secondly, it is not uncommon in deaf-mutes to find that certain small islands of hearing remain in the tone scale. This phenomenon can be explained by the fact that in congenital cases the organ of Corti is in most parts so malformed that hearing is impossible, but that in certain small areas it is sufficiently well developed for the child to hear certain tones. It is hard to see how Wrightson and Keith could explain these islands of hearing on the groundwork of their theory of the cochlear mechanism. Lastly, there is the question of experiments on animals. Certain foreign observers have shown that if a guinea-pig be subjected to a certain tone for a prolonged period and be then killed, the area of the cochlea which corresponds to that tone is found to be degenerated. By varying the pitch of the tone the position of the area of degeneration in the cochlea can be altered. It would be interesting to hear from Professor Wrightson and Dr. Keith whether they admit the correctness of these experiments, and if so, how they explain the results.—J. S. F.]

REFERENCE.—¹*A New Theory of Cochlear Mechanism*, Macmillan & Co. Ltd., 1918.

HEART AND BLOOD-VESSELS, SURGERY OF.

W. I. de C. Wheeler, F.R.C.S.I.

Rupture of the Heart.—Turner and Gould¹ state that traumatic rupture of the heart has been reported in medical literature on only 95 occasions. They record the case of a man, age 47, who fell over the rail of his ship 20 feet on to a buoy. He lived for five or six hours after the accident, and part of the time was rational and conscious. There was a fracture of the first segment of the sternum, the pericardium was found distended with blood, and when this was mopped away a small tear was found in the anterior wall of the right ventricle. The position of the tear closely corresponded with the position of the left edge of the fracture of the sternum. The following facts about the case call for comment: (1) The injury was probably due to indirect violence, as there was no bruising of the chest wall; it is presumed that the man fell on his head, and that the fracture was caused by sudden acute flexion of the dorsal spine. (2) The length of time that the patient lived may be explained by the rupture becoming plugged with clot; or perhaps the rupture did not occur until immediately before death.

The writer² (W. I. de C. W.) recorded a case of traumatic rupture of the heart. The case was that of a young actor who was killed instantly by a motor-car. The heart was practically torn into two halves from indirect violence; there was no external wound.

Gunshot Wounds of the Heart.—Gunshot wounds of the heart are the subject of much literature since the commencement of the War. The *British Medical Journal*³ mentions several interesting cases. In one, in which the 5th costal

cartilage was comminuted, *x* rays showed a large fragment of shrapnel in the pericardial sac. An incision was made, beginning at the left costal arch and extending upwards two fingerbreadths above the aperture of entry. The sternal end of the 5th rib was resected, together with 5 cm. of the 6th and 7th ribs. The fragment of shrapnel was found lodged in the parietal pericardium. On enlarging the wound in the pericardium, the apex of the heart was found superficially wounded. The wounds in the pleura and pericardium were sutured, and a drainage tube was inserted into the lower part of the pericardial sac. Septic pericarditis supervened, together with profuse hæmorrhage, which terminated fatally on the eighth day. In another case a small incision was made and the peritoneum was opened. A wound in the liver was plugged, and then the sternum was divided transversely and the pericardium exposed and opened. There was a deep transverse wound in the apex of the heart, not involving the ventricular cavity. Two sutures closed the wound in the heart. The pleura and pericardium were closed. The patient died of general peritonitis, which appeared to result from a stitch abscess from the deeper part of the abdominal incision. In the third case, seen a year after the wound, *x* rays revealed a bullet in the lower part of the heart. An incision was made under local anæsthesia, from the middle of the sternum over the 6th rib cartilage to the 6th rib. The cartilage was excised, the triangularis sterni muscle was divided vertically close to the sternum, and the internal mammary artery ligatured. The 5th and 7th rib cartilages were then excised; a large rent in the pleura produced no serious symptoms. The pericardium was incised, and contained a quantity of slightly turbid fluid. The apex of the heart was drawn forward by two pieces of catgut. The bullet was found by exploration with a needle in the apex of the right ventricle, and removed through a posterior vertical incision 3 cm. long. The patient died the third day with signs of pleurisy and pericarditis.

René Le Fort⁴ describes a case of the removal of a projectile from the cavity of the left ventricle. It seems to be the first case on record of a foreign body removed from this position. An incision was made in the 5th intercostal space, and the 5th costal cartilage divided. The pericardium was opened; the intercostal incision was transformed into a 'hinged shutter' comprising the 4th and 5th ribs. Four fine silk sutures were used for traction, and the ventricle was incised at the apex. The projectile could be felt entangled in the chordæ tendinæ; it was gently loosened and removed with Kocher's forceps. When the heart was set free, a jet of blood spurted out to a height of 1½ metres. The hæmorrhage was arrested by passing two more sutures. Recovery was uninterrupted.

Most of the projectiles removed from the heart up to the present were embedded in its walls. In only 5 of the cases recorded previously by French surgeons was the projectile removed from one of the cavities, and always from the right side—once from the auricle and four times from the ventricle. M. Le Fort has removed 11 foreign bodies from the heart in the course of nine operations—in two cases from cavities of the heart. Only one patient succumbed; all the others were cured.

Arteriovenous Aneurysm.—The knowledge that ligature of the main veins together with the artery does not increase the risk of gangrene, renders radical operation for arteriovenous aneurysm more safe and certain. When there is a substantial interval between the date of the injury and the date of operation, the collateral circulation is sufficiently established to ensure the circulation of the limb after ligature of the vessels at the site of injury. The writer had under his care in Mercer's Hospital, Dublin, a well-marked case of arteriovenous aneurysm in the lower third of the leg, following a shrapnel

wound in 1916. All the classical signs were present—namely, (1) A well-marked thrill extending over a large surface, and traceable to the inner side of the foot; (2) A loud booming sound, like a distant bombardment, heard with the stethoscope; (3) Great venous engorgement below the injury. The patient was advised elsewhere against operation. The opinion of most authorities, however, including Osler, is that arteriovenous aneurysm should be operated on unless there is some special contra-indication. These lesions offer small prospect of spontaneous cure. Aneurysms in the upper extremities are more favourably situated than those in the lower. Rarely an orifice between vein and artery closes spontaneously. Sudden death may occur from heart failure or embolism. Rupture, with fatal hæmorrhage, is more than a possibility. Œdema from varicose veins and thrombosis is common in the lower extremity, and the vascular tissue involved may take on a varied growth.

In connection with the case under review, it must be remembered that aneurysm of the posterior tibial artery is comparatively rare. A long incision was made behind the inner border of the tibia, and after division of the soleus muscle the arteriovenous aneurysm was easily isolated owing to the distention of the deep veins. The nerve was carefully dissected away from the mass, and the artery and veins excised between two ligatures for a distance of about three inches. The entire blood-supply should be controlled in these cases by a tourniquet above the lesion.

B. Cuneo⁵ describes seven cases of arteriovenous aneurysm of the femoral vessels. Five of the seven cases were of the classical type, with the arterial and venous orifices juxtaposed or united by a canal of varying diameter. In the other two cases the arterial orifice opened into a large sac which discharged by multiple orifices of small diameter. In such cases, if the arterial orifice is small, there may be a relative stagnation in the large sac favouring coagulation. If the arterial orifice is large, and the sac outlets are small, there is danger of a sac rupture. The two cases corresponded to these types.

In recent cases there exist two very distinct varieties of arteriovenous aneurysm—one characterized by the absence of dilatation of the superficial veins and with an almost normal venous pressure; the other by ectasia and an arterialization of the superficial veins as well as by a very high venous pressure. The distinction between these two varieties is unquestionably due to the action of the valvular system; so long as this action is sufficient, the arterial wave cannot be transmitted beyond the first valvular segment; when the valves have broken down, the circulation disturbances become considerable. It is important to distinguish between these physiological types, because the difficulties and results from operation differ in the two cases. The second type is the natural outcome of the first, and the period of tolerance depends principally on the size of the arterial orifice and the character of the individual valvular apparatus.

The method of operation followed by Cuneo was suture of the vascular orifices in two cases, extirpation of the communicating segments in three cases; quadruple ligature in the immediate neighbourhood in one case; and opening of the sac and ligature of an ulcerated arterial trunk in one case. All seven cases recovered.

Cuneo thinks that the simplest operative course to follow is this: To define clearly the situation of the aneurysm by finding the intersection of the line uniting the orifices of entry and outlet of the projectile with the line indicating the course of the artery. To disclose the artery by an incision giving plenty of light and directly aimed toward the aneurysm. If it is a case where there is no valvular insufficiency, the disclosure is easy; but if there is valvular

insufficiency there may be considerable hæmorrhage. It is then useless to waste time in placing forceps. The principal trunks must be seized, disengaged from their position, and compressed between two fingers, even at the site of the aneurysm. Hæmorrhage will cease almost as by magic. A few forceps will secure hæmostasis. Two clamps are then placed immediately above and below the aneurysm. These generally, but not always, realize a complete hæmostasis, but in any case sufficient to enable the two vessels to be isolated. The disposition of the orifices should then be examined to see if suture is possible or not. If this is too difficult, extirpation of the injured vascular segments may have to be resorted to, or a simple section of the two vessels. The operation is ended by ligature of the four ends.

Tuffier⁶ gives the details of an operation which he performed in the case of a patient with an arteriovenous aneurysm situated in Hunter's canal at the point of origin of the popliteal, and in which, in order to avoid gangrene of the lower limb after ligature and resection of the vessel, he anastomosed the two arterial ends by a tube of paraffinated silver. Eight days after the tube had been inserted the wound was again opened up and the tube removed. The operation, according to the author, appears to demonstrate the possibility of replacing an artery, such as the femoral, by a tube of paraffinated silver for a length of 5 cm. There will perhaps be frequent applications of this method in cases of accidental or surgical arterial rupture; but it remains to be seen how long the tube can remain in place without causing coagulation or accident. In the present case a week elapsed.

REFERENCES.—¹*Lancet*, 1917, ii, 567; ²*Trans. Roy. Acad. Med.* 1907, xxv, 413; ³*Brit. Med. Jour.* 1917, ii, 871; ⁴*Lancet*, 1918, ii, 334; ⁵*Bull. et Mém. Soc. de Chir.* 1917, xliii, 415 (abst. *Surg. Gyn. and Obst.* 1917, Nov., 459); ⁶*Ibid.* 739 (abst. *Ibid.* Oct., 343).

HEART DISEASE. (See also ANEURYSM, ANGINA PECTORIS, AURICULAR FIBRILLATION, MYOCARDITIS, PERICARDITIS, RHEUMATIC HEART DISEASE, SOLDIER'S HEART, TACHYCARDIA.) Carey Coombs, M.D., F.R.C.P.

Pregnancy and Heart Disease.—Mackenzie,¹ in a brief summary of a fuller account to be published later, says he finds no evidence of the cardiac hypertrophy stated to occur in normal pregnancy, but there is a distinct diminution of the reserve force of the heart. This is of course aggravated if the woman has a diseased heart. Signs of cardiac failure calling for termination of labour are: dropsy if accompanied by other signs of heart disease, œdema of lungs (crepitations at bases, persisting after change of posture, with impaired percussion note), and orthopnoea. In mitral stenosis, a persistent tachycardia of 100 or over, with palpitation on slight exertion, also constitutes an indication; and in aortic regurgitation, a Corrigan pulse and a forcible apex beat outside the nipple line.

Kellogg² gives an admirable summary of his exhaustive studies. He thinks a woman who has mitral stenosis of any degree, who has successfully weathered one pregnancy, is wise to abstain from further pregnancies; but, as he points out, it is very difficult to write dogmatically. It is possible to state the average risks to mother and child in terms of statistics, but the line of action taken in an individual case must vary with the particular circumstances. The temptation is, of course, in the direction of letting patients go to term who are not fit to do so. His advice is to see what effect careful treatment will have on the cardiac condition, and in the really decompensated cases to terminate pregnancy unless there is quick response to treatment. As to methods of termination, these are expressed by him in the following table:—

CHOICE OF METHOD OF DELIVERY OF CARDIACS FIRST RAISED TO
HIGHEST POINT OF CIRCULATORY EFFICIENCY.

COMPENSATED WITH SUB-EFFICIENT CIRCULATION.			DECOMPENSATED 1°.		DECOMPENSATED 2°.	
	Primipara.	Multipara.	Primipara.	Multipara.	Primipara.	Multipara.
1ST 2ND 3RD MTHS	Morphia, ether-oxy- gen, dilata- tion and curettage	Ditto	Ditto	Ditto	Morphia, ether only if neces- sary, dilata- tion and curettage	Ditto
4TH 5TH 6TH MTHS	Vaginal hysterotomy Perforation A. C. Head 2d choice : Bag, Version Perforation	Ditto	Ditto	Ditto	Ditto	Ditto
7TH 8TH MTHS	Abdominal Caesarean (?) steriliza- tion	Abdominal Caesarean sterilization if living chil- dren	Vaginal hysterotomy 2d choice : Bag, forceps at full dilata- tion	Ditto 2d choice : Ditto	Ditto 2d choice : Ditto	Ditto 2d choice : Ditto
TERM	Abdominal Caesarean (?) steriliza- tion	Abdominal Caesarean sterilization if living chil- dren	Bag, forceps at full or nearly full dilatation	Ditto	Ditto	Ditto

'Operative Risk' in Cardiac Disease.—Blackford, Willius, and Haines³ have given systematic attention to the admissibility of operations on patients with organic disease of the heart. Like Kellogg, they are confronted by the difficulty of making categorical statements about conditions which include such a multiplicity of factors as is encountered in heart disease. They have therefore paid special attention to demonstrably grave stages of cardiac disease, such as auricular fibrillation and flutter, and heart block. Their general conclusion is that, given careful anaesthesia and wise general handling of the cardiac symptoms, even such grave evidences of heart disease do not necessarily contra-indicate operation. Indeed, they claim that in cases of thyroid disease operation may actually do good by removing a cause of the cardiac breakdown. (See also MYOCARDITIS.)

Vital Capacity of Lungs in Heart Disease.—McClure and Peabody⁴ estimate the vital capacity by means of an ordinary well-balanced spirometer of 8-litre capacity. The patient is told to take as deep an inspiration as possible, and then to insert the tube to the spirometer into the mouth and to give a complete expiration. They tested the value of such observations on 24 patients with serious cardiac disease, and charted their findings in the form of curves. These, they claim, furnish an indirect and fairly trustworthy index of the progress of the cardiac condition; the argument being that the vital capacity diminishes with the increase of dyspnoea, which itself increases with the gravity of the cardiac lesion.

Sarcoma of the Heart.—Perlstein's⁵ exhaustive search through the literature

discovered only 30 cases of primary sarcoma of the heart. It is most common in the vigorous years of life, and produces no characteristic clinical picture.

TREATMENT.—Pratt⁶ pleads for a more intelligent use of **Digitalis** in all forms of cardiac failure, although its special indication is of course auricular fibrillation. Two things are essential; the use of a good preparation and the employment of full doses. He thinks a sound tincture is as good as any of the various substitutes proposed; 15-minim doses are given till a physiological effect is produced. He has also found that in cases of cardiac failure not relieved by digitalis, **Strophanthin** injected intravenously may succeed. This latter is the subject of a careful study by Zueblin.⁷ Ouabain, or crystalline strophanthin, was used in a number of cases. It appears that the beneficial effect of a single intravenous dose, if timed auspiciously, may last for many days. The dose given by Pratt, of the amorphous preparation issued in tabloid form, was 0.5 mgrm. In one case described by him in detail, signal and lasting benefit was conferred by a single dose.

Hewlett and Kay⁸ did not find **Tyramine** of much use in circulatory failure during infectious disease, but in failure during or after operations it gave strikingly good results in five out of seven cases.

Zanger⁹ claims great benefit for the heart of senile cardiosclerosis from the prolonged administration of **Camphor** (10 to 15 drops of the tincture on sugar two or three times daily). This he derives from over ten years' experience of its use.

Blackford and Willius¹⁰ find that in chronic heart-block the idioventricular rate is quickened, and the patient much relieved, by **Alpha-Iodine** pushed to the limit of tolerance. This drug, the active constituent of the thyroid gland, is given by mouth in doses of 1 to 3 mgrms. daily. (See also **X-ray** diagnosis, p. 31.)

REFERENCES.—¹*Lancet*, 1918, i, 50; ²*Boston Med. and Surg. Jour.* 1917, ii, 398; ³*Jour. Amer. Med. Assoc.* 1917, ii, 2011; ⁴*Ibid.* 1954; ⁵*Amer. Jour. Med. Sci.* 1918, ii, 214; ⁶*Jour. Amer. Med. Assoc.* 1918, ii, 618; ⁷*Med. Rec.* 1918, ii, 359; ⁸*Jour. Amer. Med. Assoc.* 1918, i, 1810; ⁹*Lancet*, 1918, i, 143; ¹⁰*Amer. Jour. Med. Sci.* 1917, ii, 585.

HEART, SOLDIER'S. (See SOLDIER'S HEART.)

HEARTBURN AND HYPERACIDITY.

Robert Hutchison, M.D., F.R.C.P.

Fischbein¹ denies that heartburn is a symptom of hyperacidity. He has found that in many cases of heartburn the test meal shows normal or hypo-acidity, or sometimes even absence of acidity altogether. When continuous and persistent, heartburn is a totally different disorder from hyperchlorhydria, and requires different treatment. It is a neurosis, and is due, not to the acidity of the gastric juice, but to a hyperæsthesia of the gastric mucous membrane.

The treatment of heartburn is very unsatisfactory, as it is difficult to arrange a Diet suitable to all cases, and one has to fall back upon purely empirical rules. Milk and cream are not well borne by most patients. Some do moderately well on carefully prepared cereals and vegetable purées; others thrive better on boiled or broiled lean meats and fish. The difficulty of the dietetic treatment of heartburn is undoubtedly the reason for the variety of diets recommended for hyperacidity, which most authors confuse with heartburn. As to the medicinal treatment, the alkalies are not only useless, but they even increase the heartburn, and they are regurgitated sour when there is an associated hypersecretion. The **Bromides**, combined with small doses of **Chloral**, act well in a number of cases, but they cannot be continued for any length of time, on account of the disfiguring acne which they produce in

these patients after a few days' use, and the chloral alone does not act so well. In a few cases small doses of Opium combined with the tincture of Cannabis Indica and Belladonna have given satisfactory results.

REFERENCE.—¹*Boston Med. and Surg. Jour.* 1918, i, 86.

HELMINTHIASIS. (See also ANKYLOSTOMIASIS.)

Sir Leonard Rogers, M.D., F.R.C.P.

The *Fasciolopsis* of China are dealt with by N. W. Brown,¹ who has examined 188 species, and divides them into the long-known *F. buski* without spines, and a second group with cuticular spines which he proposes to call *F. spinifera*.

Echinostoma ilocanum (Garrison) has been found by J. S. Hilario and L. D. Wharton² in the Philippines, through the detection of the ova in stools and careful search for the minute worms after the use of male fern to expel them. An illustrated description is given.

The prevalence of common intestinal parasites in the Philippines is dealt with by F. Garcia,³ hookworms being the most important.

REFERENCES.—¹*Johns Hop. Hosp. Bull.* 1917, Oct., 320; ²*Philippine Jour. Sci.* 1917, July, 203; ³*Ibid.* Jan., 25.

HEMERALOPIA IN SOLDIERS.

R. Foster Moore, F.R.C.S.

M. Danis¹ accepts as the most probable cause of night blindness a defect of the sensitivity of the retina owing to a change in the retinal pigment, probably of vascular origin. Its development is favoured by bad hygienic conditions and faulty nutrition. Danis next makes an interesting survey of the views of about twenty-five authors as to the cause, etc., of this defect. With regard to the seasonal incidence, the number month by month is given of men who complained of this trouble from October, 1915, to February, 1918. On looking through these figures it is remarkable how little difference there is between the numbers for the light months in the summer and those in the dark months. The scrimshankers amounted to 11 per cent. Twenty men expressed themselves as completely cured, some of them by correction of errors of refraction, some by arsenic and strychnine, and some simply by rest.

A suggested classification of hemeralopes is as follows:—(1) Those with lesions of the retina; (2) Congenital; (3) Those with optical errors: (a) non-corrected refractive errors, (b) those with corneal or lenticular opacities; (4) Those without lesions: (a) with corrected errors of refraction, (b) emmetropes; (5) exaggeraters and actual scrimshankers.

The predominance of night blindness in myopes is noted, and four cases given by Landolt are quoted. Danis believes that the cause of the disease is nervous strain and exhaustion, that this reacts upon the choriocapillaris, and through it upon the retinal pigment, and so upon the production of visual purple.

REFERENCE.—¹*Arch. méd. Belges*, 1918, July, 63.

HERNIA.

E. Wyllys Andrews, A.M., M.D.

H. B. Greenwood, of Leeds, describes a device to strengthen the abdominal wall in ventral hernia, especially in hernias of large size following septic wounds. A longitudinal incision is made through the anterior layer of each rectus, and after the rebellious contents have been forced in, the two rectus muscles are drawn close together with their sheaths overlapped. It is important, in Greenwood's opinion, to preserve the anatomical integrity of the parts adjoining the semilunar line.

Moschcowitz, of New York, emphasizes the importance of small epigastric hernias without palpable swelling. Their symptomatology is constant, whereas in most parts of the abdomen hernias are symptomless. These patients

have eructations, nausea, and periodical pain in the epigastrium. They are often mistaken for gastric or duodenal ulcers. Physical examination reveals a small tumour between the umbilicus and xiphoid. They vary greatly in size, sometimes being very small. The most constant physical sign is local tenderness, and this is found even in the smallest hernias. Many mistakes of diagnosis result from failure to note these small protrusions. Moschcowitz also discusses the relation of the iliohypogastric nerve to the radical cure of inguinal hernia, as does Dowd, of New York, who has recently published a monograph on the importance of preserving this nerve in a radical-cure operation.

Charles Bennett, of Glasgow, presents some comments on the modern radical-cure operation for inguinal hernia. He thinks the general verdict is in favour of direct hernias being acquired, while those who support the theory of congenital origin are outnumbered. The method of radical cures should aim to remove as much as possible of the sac and to erect a strong barrier in front. The conjoined tendon should be stitched to Poupart's ligament well up to the edge of the rectus, and the external oblique closed over this. At best it is not possible to make the direct hernias as secure against recurrence as the indirect.

W. Sampson Handley¹ reports a method of radical cure for inguinal hernia by a darning or stay-lace process. He objects to the placing of filagrees, which are foreign bodies, and may become encysted, and prefers to lace back and forth from Poupart's ligament to the conjoined tendon with a lacing of stout silk like a shoe-lace. These threads are not drawn tight, but remain quite slack. For the repair of the external oblique he uses what he calls a darning stitch of stout silk, crossing the suture line repeatedly, and left loose rather than tightly drawn.

Lieut.-Col. Hull² emphasizes the importance of choosing that operation which best answers the purpose in the shortest possible time. After an experience with 500 cases, he advocates local anaesthesia, and incision through the external oblique directly over the cord. With hæmostatic forceps the sac is drawn up until it can be amputated at its neck, which should be gently pulled down and ligatured as high as possible. In 90 per cent of cases this is all that is necessary to do, the small incision being closed with silkworm gut, which includes both skin and external oblique. He finds this method especially valuable in recurrent hernias.

R. V. Slattery³ describes an operation for inguinal hernia. The canal is exposed as in Bassini's operation, and the sac radically removed high up. The cord is freed from its bed and drawn aside. The fascia, transversalis, and fleshy arch of the internal oblique are drawn down to Poupart's ligament by three or four mattress sutures, whose knots then lie in Scarpa's triangle, after which the external oblique is closed.

E. Finochietto⁴ describes a modification of the Andrews operation somewhat like Postemsky's. Twice in bilateral cases he used this upon one side and Bassini on the other, the hernia recurring on the Bassini side both times. The first plane of sutures takes in Poupart's ligament and the upper margin of the external oblique, which is thus overlapped and of double thickness. The cord can be left between the overlapped layers, or outside of both.

REFERENCES.—¹*Practitioner*, 1918, June, 466; ²*Brit. Med. Jour.* 1917, Oct. 27; ³*Lancet*, 1917, Sept. 22; ⁴*Prensa Med. Argentina*, 1917, Nov. 10, 207.

HERPES ZOSTER.

E. Graham Little, M.D., F.R.C.P.

Sajous¹ reviews theories of causation of herpes zoster, and considers most probable the recently expressed opinion, founded on the experimental work of Rosenow and Oftedal, that the cause is an infective one, probably streptococcal, and that the tonsils and gums are the most frequent portal of entry.

It is accordingly suggested that the use of a vaccine would be beneficial if an autogenous culture could be obtained in time to be applied. More practical is the advice to increase the patient's resistance by rest in bed, complete mental inactivity, and free evacuation of the bowels, which may also be a source of sepsis. For the pain which attends the eruption and is often severe, vasoconstrictors are recommended, the best of which is said to be fluid extract of *Ergot* in drachm doses; *Morphine* and *Codeine* may be required in very painful cases. Local treatment includes the protection of the site of disease from pressure and secondary infection, by a contrivance like the vaccination-shield. A dusting powder of *Starch* with 10 per cent *Boric Acid*, or a mixture of equal parts of *Talc* and *Oxide* or *Stearate of Zinc*, or *Lassar's Paste* may be applied. In the milder cases with pain, *Camphor*, mixed with three parts of zinc oxide and twelve parts of starch, may prove serviceable. Alcoholic solutions of 0.5 to 3 per cent *Phenol*, *Menthol*, or *Resorcinol*, to be allowed to dry on and followed by a dusting powder, have also been recommended. Probably most efficient is *Cocaine* 1 per cent in an ointment, or one of the allied local anæsthetics. A solution containing 2.5 per cent of cocaine and 1 per cent of adrenalin is recommended by Fabre. A mild *Galvanic Current*, the *High-frequency Current*, and *Ionic Medication* with *Quinine Sulphate* seem also at times to have procured distinct relief.

Lain² suggests that herpes zoster of the so-called idiopathic type is due to a 'focal infection,' the teeth and tonsils being perhaps the most frequent sites. He records six cases, in five of which he was able to demonstrate by radiography the presence of pus pockets in the teeth and in one case in the tonsil.

REFERENCES.—¹*N. Y. Med. Jour.* 1917, ii, 1096; ²*Jour. Cutan. Dis.* 1917, Aug., 486.

HODGKIN'S DISEASE, CUTANEOUS METASTASES IN.

E. Graham Little, M.D., F.R.C.P.

Alderson¹ records a fresh case of this rare condition. The patient was a man, age 28, showing glandular enlargements above the clavicles, and, two years later, hard, immovable, painless, non-inflammatory swellings on both legs, which softened and broke down to form ulcers very like syphilitic gummata. The Wassermann test, taken repeatedly, was negative, and no improvement resulted from antisyphilitic treatment. Histological examination of the glands and the skin tissue demonstrated changes characteristic of Hodgkin's disease. X-ray therapy was then substituted for the antisyphilitic treatment, and was completely successful in healing the ulcerations.

REFERENCE.—¹*Jour. Cutan. Dis.* 1917, Aug., 481.

HOOKWORM DISEASE. (See ANKYLOSTOMIASIS.)

HYPERIDROSIS.

E. Graham Little, M.D., F.R.C.P.

The following formulæ have been recommended¹ in the treatment of excessive sweating of the axillæ and feet. A 25 per cent solution of aluminium chloride in distilled water, dabbed gently on the part every second or third day. Three applications are usually sufficient, but if the condition recurs the treatment may be repeated. A 2 to 5 per cent solution of *Liq. Formaldehyde* in water, a 5 per mille solution of *Potassium Permanganate*, or pure *Glycerin* may be used. The preparations should be weaker for the axillæ than for the feet. More active, and therefore to be used with more care, especially in the axillæ, are '*Chromic Acid*' solutions, as :—

R Chrom. Trioxid.

2.5 c.c. | Aq.

50 c.c.

Use as a paint once a week.

Less active, but more pleasant than the foregoing, is :—

R	Acid. Tannic	5 grms	Aq.	ad 200 c.c.
	Alcohol	100 c.c.		

Use as a wash twice a day.

Various drying powders have also been suggested for this condition, as :—

R	Acid. Boric	10 grms	Talc. Purif.	100 grms
R	Acid. Salicyl.	5 grms	Zinc Stearat.	20 grms
	Bismuth. Subnit.	40 grms		
R	Acid. Salicyl.	2 grms	Pulv. Amyli	20 grms
	Bismuth. Subnit.	20 grms		

If inflammation is caused by any of these applications, cold cream containing 12 per cent Boric Acid or Calamine Lotion, with or without 5 per cent Carbolic Acid, may be applied.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1918, i, 91.

HYPERTRICHOSIS.

E. Graham Little, M.D.; F.R.C.P.

Macewen¹ has a suggestive paper on this subject, emphasizing the part probably played in the production of the growth of hair by the ductless glands, especially the sexual endocrines, which have received insufficient study. Heredity is an important factor, certain races, the Jew and the Celt, showing an especial tendency in this direction. He seems to regard acne vulgaris as a predisposing cause, which is not commonly recognized as such. The only practical treatment is Electrolysis, which should be conducted with special care to prevent scarring, and it is better to do too little than too much. Penetration of the needle to the depth of $\frac{1}{16}$ inch, the immediate cessation of current when a minute circular vesicle appears about the follicular orifice, and the restriction of dosage to $3\frac{1}{2}$ ma., are practical directions in performance of the operation, which requires minute attention and skill, and the dermatologist should not relinquish these cases to the careless quack, as is so often done.

REFERENCE.—¹*Jour. Cutan. Dis.* 1917, Dec., 829.

ILEOCÆCAL INSUFFICIENCY. (See TOXÆMIA, ALIMENTARY.)

ILEO-COLITIS, ACUTE, IN INFANTS. *Frederick Langmead, M.D., F.R.C.P.*

† J. Aikman¹ has analyzed 54 cases : 27 were of infants under six months old, 8 between six and twelve months, and 12 between one and two years, all of which occurred in the summer or early autumn. Few gave a history of previous disease. There were only 4 breast-fed children in the series, and 9 fed on modified milk. Fourteen had been fed on condensed milk previous to admission, and several on barley-water mixtures of little or no food value, for a considerable period. Factors in the cause were insanitary home conditions, poverty, and carelessness in the preparation of the food. The mortality was 33.3 per cent, the younger the child the worse being the prognosis. He formulates the dictum that a child under six months of age, who is poorly nourished and has been fed on condensed milk, has little chance of recovery if his temperature is over 102°, if he is vomiting, and has eight liquid green stools with much mucus and a little blood daily, even if the pulse is slow and nothing can be made out in the abdomen. He has no chance if he is having convulsions. The duration of the cases averaged fifteen days ; those who recovered were ill for about three weeks ; those who died, for an average of nine days. The series demonstrated the danger of infection, and that a convalescent child may infect others, especially younger children. Prophylaxis is therefore of the greatest importance.

TREATMENT.—He omits milk altogether from the diet for a few days, and as a substitute gives **Cereal Water**, with or without sugar. Sugar should not be given if the stools are frothy. Fresh weak **Tea** has a considerable value. Barley-water is utilized by most but rejected by a few. Return to milk should be made very gradually, first adding sugar, then skimmed milk, then whole milk. Very small amounts should be given frequently, especially if there is vomiting; too large meals are often wrongly given. Medicinally, **Bismuth Subnitrate** in 10-gr. doses, **Precipitated Sulphur** 1 gr., and **Salol** may be of value. **Dover's Powder** or **Paregoric** is also used. Some claim that small doses of **Castor Oil** will help to control the diarrhœa. Scrums are of little value, and Bulgarian bacillus cultures cannot be depended upon. Local treatment consists in **High Rectal Irrigation** through a No. 25 French catheter, and a gallon or more may be used if a free return of the fluid is permitted. One or two irrigations daily are sufficient, and should be stopped if the stools become more frequent. The after-care consists of careful supervision of the diet, observation of the stools, and frequent recording of the temperature.

REFERENCE.—¹*Arch. of Ped.* New York, July, xxxiv, No. 7, 504 (abstr. *Jour. Amer. Med. Assoc.* 1917, ii, 849).

IMPETIGO.

E. Graham Little, M.D., F.R.C.P.

Impetigo Contagiosa.—MacCormac¹ describes impetigo contagiosa as seen in a large skin hospital for soldiers. Of 1786 skin admissions, no less than 1421 were to be ascribed to impetigo primary or secondary. He divides the cases into four groups:—

1. *Primary impetigo*, comparatively rare in soldiers, and offering no special features as compared with its prevalence in civil practice. The treatment recommended is to smear the crusts with **Liquid Paraffin**, apply **Boric Starch** poultices or fomentations to remove the scabs, and anoint the opened sores with **Zinc Ointment** to which 1 per cent of **Ammoniated Mercury** is added. If a persistently bullous type is met with, the bullæ should be pricked, washed with 1-1000 **Perchloride**, and dusted with a powder consisting of equal parts of **Starch** and **Zinc Oxide**, to which 10 per cent of **Boric Acid** is added.

2. *Ecthyma.* This is simply a deep form of impetigo contagiosa. The lesion is to be distinguished from a boil by the absence of a central hair follicle. A lotion of **Eusol** (half strength) or 1-1000 **Perchloride** is advised. Sluggish sores should be painted with a solution of 2 per cent **Silver Nitrate** in sweet spirits of nitre.

3. *Impetigo complicating seborrhœic eczema.* The author offers the axiom that every impetigo occurring above the neck in soldiers is probably a case of impetiginized seborrhœa. The best application is **Calamine Liniment** of the following formula:—

R Calaminæ	gr. xx	Aq. Calcis	5ij
Zinc. Oxid.	gr. xv	Ol. Olivæ	3j

To bring it into intimate contact with the diseased skin, scabs must first be removed, and, after shaving or close clipping, soaked lint applied to face and scalp; all crevices in and behind the ears are packed with soaked cotton-wool. Such treatment is either continued until cure, or towards the final stages **Lassar's Paste** with 2 per cent **Salicylic Acid** or **Ichthyol** may be substituted. Should chronic fissures develop, they may be painted with the silver nitrate solution 2 per cent. Running ears must be syringed frequently. Two complications often arise—boils and conjunctivitis. The former responds to **Foments** and stock **Staphylococcal Vaccines**, the latter to frequent washing with **Boric Lotion** and eye drops of boric lotion containing 0.5 per cent **Cocaine**.

4. *Impetigo complicating scabies.* The scabies should always be treated

first with three days' Sulphur as described under SCABIES (q.v.). For the irritable condition which persists after the scabies is removed, Lassar's Paste with Ichthyol is rubbed over the skin during the day, and Calamine Lotion dabbed on at night. Ecthymatous lesions are treated as described above.

Morrow² prefers to the mercurial treatment the application of a 20 per cent solution of Silver Nitrate. The vesicles or pustules are ruptured with gauze, the sodden epithelium which comprised part of the wall is removed, and the base of the lesion is thoroughly covered with a silver solution, the application of the remedy being made with a swab. Where crusts have formed it is usually an indication that the disease is still spreading at the base. The crusts should likewise be removed by rough friction with gauze, and the underlying areas treated with a silver solution applied in the same way as to the vesicular and pustular bases.

Impetigo in Infants.—Triboulet³ recommends the application of the following lotion, which has the composition of "Ziehl's fuchsin stain." Fuchsin 1 gm., alcohol 10 grms., phenic acid 5 grms., distilled water 100 grms.; this is to be applied daily on cotton pressed upon the lesion.

REFERENCES.—¹*Brit. Med. Jour.* 1918, i, 143; ²*Med. Press and Circ.* 1918, Oct. 31, 334; ³*Jour. Amer. Med. Assoc.* 1918, i, 350.

INFANT FEEDING.

Frederick Langmead, M.D., F.R.C.P.

Artificial Feeding.—F. R. Talbot¹ reviews the chief changes which artificial feeding has undergone during the past ten years in the U.S.A., and draws attention to the uselessness of extreme views. The earliest dictum he recalls is that the percentage composition of cow's milk in artificial feeding should be so modified as to resemble as nearly as possible human milk. The set of formulas was strictly adhered to, and the smallest variation was regarded as heretical. But human milk varies greatly in its composition, and most breast-fed infants thrive and develop normally, whilst artificially-fed infants usually progress well at home if they are protected from external injurious factors, have good hygienic surroundings, and are not over-fed. A small number thrive only when the milk is modified with the greatest care, and others have been improperly fed over a long period and are made to progress well only with the greatest difficulty.

Excess of Fat received the next attention, for many babies were found to be suffering in this way, due to an anxiety to make them gain weight, and also to failure to realize that cream might contain as low as 5 per cent, or as high as 40 per cent, of fat. It became customary to consider all indigestions as due to fat, and this received an impetus from microscopical as well as macroscopical examination of the stools. Any fat at all in the stools was assumed as evidence that too much was being given, and the amount was reduced to a harmful degree. It should be reduced only when the fat in the stools coincides with indigestion. A true fat-indigestion may be said to exist when the stools resemble scrambled eggs, whilst 'soap' stools and those containing soft curds, which are far more common, may or may not have this significance, and the clinical symptoms furnish the necessary evidence for diminishing the fat in the food. Soft curds are generally due to too much carbohydrate and not too much fat.

To replace the fat, large percentages of *carbohydrates* were given, and are widely advertised by the manufacturers of various proprietary foods. Many babies were found to gain rapidly on the relative excess of carbohydrates, though muscle-building protein was too restricted. The increase in weight did not represent muscle and bone, but was made up either of fat or water. If the former, the baby became fat and pasty, unable to resist infection, and

succumbed easily to disease. If the latter, the baby became puffy and œdematous, and later, with loss of the water, there resulted a rapid loss of weight. Sour watery vomit, flatulence, and green and scalding stools are among other symptoms of excess of carbohydrate. The stools often contain soft fatty curd, and provoke the misconception that the condition is one of fat-indigestion. When the frequency of carbohydrate-indigestion became recognized, many physicians began to give foods low both in carbohydrate and fat.

Protein, the remaining constituent, became used in higher proportions to furnish the necessary calories, and the German schools taught that protein is harmless. This led to the exclusive use of whole milk or skimmed-milk mixtures. The former had been the practice of Budin in Paris for many years; the latter was that of the Boston Floating Hospital during a recent summer. In the latter case, all infants, irrespective of age or condition, were fed on undiluted skimmed milk. Some did well, others poorly, whilst a few became so ill that human milk became necessary to save them. The principal evidence against the use of high protein feeding depends upon the observations of Selter, Gellhorn, Holt, and Hooblen, who describe an 'intoxication' from too much protein in the food, of which the symptoms are subnormal temperature, slow pulse, superficial respiration, and a bluish-grey colour of the skin. The stools are curdy and greyish-yellow, with a cheesy odour.

To prevent extremes, Talbot proposes the following rules: (1) A new-born infant needs, roughly, about 60 calories per kilo of body weight; a three-months-old infant from 100 to 200 calories; a six-months-old infant 90 to 100 calories; and a nine-months-old infant 70 to 90 calories. (2) The composition of the food should be adapted to the digestion of the individual, but in no instance should more than 4 per cent of fat or 7 per cent of sugar be given. The limits of protein are more difficult to define, but at least 7 per cent of the food calories should be protein. (3) The clinical symptoms plus the gross appearance of the stools should be guides as to whether the food elements are digested or not. Microscopical examination of the stools in infancy is only of secondary importance and confirmatory. (4) Due consideration should be given to the balance of the food components, especially of fat and carbohydrate in relation to protein, and care should be taken that sufficient vitamins, both fat-soluble and water-soluble, are present to insure proper growth.

Dried Milk.—The Local Government Board has opportunely issued a *résumé* of F. J. H. Coutts's² report. As the report shows, although many varying procedures are used in their manufacture, two methods are employed most commonly: (1) Passing liquid milk over metal cylinders heated internally by steam or water; and (2) Spraying milk, after partial condensation, into heated air. The prepared powder keeps for several weeks or months if kept dry. On mixing with warm water in the proportion of 1 part (by weight) of the powder, to 7 parts (by weight) of water (approximately 1 large teaspoonful to 2 tablespoonfuls of water) a liquid is obtained corresponding to the composition of ordinary milk, but usually having a slight boiled taste and a tendency for a little solid matter to settle or for fat to rise to the top.

Dried milk, as put on sale, usually comes under one of four classes: (1) Full cream; (2) Three-quarters cream; (3) Half cream; and (4) Skimmed. Full cream dried milk for baby feeding is sometimes sold under this description, but more usually is known by special names and brands. The important caution is given, that before using it, it must be borne in mind that *babies should wherever possible be fed solely on their mothers' milk*. If this is impossible, it is best to feed them partly on the breast and partly on the bottle, for no other food can actually replace breast milk. If, however, the infant must be hand-fed, cow's milk in some form is the most satisfactory available substitute.

Experience during the last twelve or fourteen years has shown the value of dried milk. It has been largely employed in infant-welfare centres, and it is evident that a large proportion of babies can take dried milk very well and thrive and develop satisfactorily. It is easy of digestion, and vomiting is less frequent than with ordinary cow's milk. Fresh, clean, pure, raw cow's milk is a very good food for the baby when natural feeding is impossible, but unfortunately the milk ordinarily sold does not conform to this description, being often far from clean (and we might add far from fresh, pure, or raw) and containing large numbers of germs. Such milk, especially in summer, will not keep a day without becoming sour, and is apt to cause digestive troubles in babies. Dried milk contains fewer germs, and is less likely to contain those of infectious diseases, nor do they multiply in dried milk as they do in liquid milk. Since dried milk keeps well as long as it is dry, only as much should be made up at a time as is required for one feed. Pasteurized, sterilized, and boiled cow's milk, have this disadvantage in comparison with dried milk, that they do not keep well, especially in summer.

Unsweetened full cream condensed milk is useful, but, when mixed with water in the proportions sometimes recommended, is too weak. *Sweetened condensed milk* is often used, but, when made up to give the right proportion of fat, has a very excessive amount of sugar. The baby usually becomes fat and flabby, and is liable to suffer from diseases such as rickets. Other infant foods containing an excess of sugar are attended with the same risks. Among them must be included the '*malting*' milks, which differ from sweetened condensed milk in the nature of the sugar. In condensed milk this is mainly cane sugar; in '*malting*' milks, malt sugar, derived from the malted cereal used in their preparation. The ordinary *patent infant's foods*, containing large quantities of practically unaltered starch, are worse than sweetened condensed milk or '*malting*' milk, and unfit for a baby under seven months old.

Under these circumstances it is not surprising that dried milk is becoming used to an increasing extent in welfare centres, being regarded as, on the whole, the most convenient and suitable food when infants cannot get breast milk. The full-cream variety should alone be used, unless by the advice of a doctor. Commencing with 1 teaspoonful of dried milk in 3 tablespoonfuls of water in the first or second weeks of life, it can rapidly be increased to $1\frac{1}{2}$ to 2 teaspoonfuls of dried milk in 4 or 5 tablespoonfuls of water by the end of the second month, and so on to 5 teaspoonfuls in 10 tablespoonfuls of water at the age of five or six months. The fear that scurvy or rickets might result has not been realized, but as an extra precaution against the former, a little fruit-juice may be given once or twice a week.

Oatmeal Gruel.—Levinson³ urges the use of oatmeal gruel as an important addition to other infant foods, and prefers a 5 per cent solution. The meal is washed in cold water, boiled for thirty minutes, and then strained. It can be given at any age with benefit, increasing the child's appetite, making the stools homogeneous, and often relieving constipation. An advantage is its high iron content. The calorie value of 1000 grms. is fifty-four large calories.

Breast Feeding.—After a detailed description of the mammary secretion, T. S. Westcott⁴ states that since sugar is the least variable in its proportion, it follows that the cause of digestive disturbance will usually be found in changes either in the fat or proteids, and most frequently excess or deficiency of fat will be discovered. The normally constituted infant can digest and thrive on a normally balanced milk, but many infants are born with digestive capacities for the different elements that vary greatly from the normal. One type can digest an unusually high proportion of fats, but has subnormal powers of digestion for proteids, and normal for sugar. Such infants can thrive on a

breast milk rich in fats, or on a comparatively high proportion of cow's cream. Another type can appropriate only low percentages of fat, but higher than normal of proteids. Such infants thrive upon a breast milk poor in fat, or upon simple dilutions of whole milk. A third type can digest only low percentages of fat and proteids, but have an unusual capacity for sugar. These are they who thrive surprisingly well upon condensed milk, but may have difficulty in digesting that of their mother or of a wet-nurse.

When the infant fails to acquire a more normal digestive power after some weeks of difficulty, the problem requires careful handling on the part of the medical man. Too often the milk is regarded as 'poor,' and the child is unnecessarily weaned or put on a mixture, irrespective of the underlying cause of the trouble. A careful analysis of the mother's milk should be made, either of the whole contents of the gland or that flowing during the middle third of the period required for its evacuation. Several analyses on different days give a better index to its composition, but even one may furnish valuable information.

When there is a marked divergence from the normal proportions of solids, in one or more of the constituents, especially if the defect fits in with the baby's symptoms, much can be done to remedy the disorder in many instances. A high fat content may be reduced by cutting down the meat and alcohol in the mother's diet, whilst a high proteid content will often yield to increased physical exercise in the open air. When there is a deficiency in the quantity of an otherwise well-balanced milk, the output may sometimes be increased by massage of the breasts for five or ten minutes three times a day, combined with a good extract of malt at meal-times, and an increased quantity of fluid, preferably milk. When the quantity is sufficient but the quality poor, very little can be hoped for by any treatment of the mother, and recourse to substitute feeding or a wet-nurse becomes necessary.

A common condition that obtains among women of the more prosperous class early in lactation is a gradual failure of supply despite all treatment. Under these circumstances test feeds, weighing the baby before and after feeding, may furnish valuable information as to whether practically no milk is being obtained from the breast, or a relatively moderate or a large quantity. Many women are capable of furnishing a fairly constant but limited supply of good breast milk for months, and the deficiency can be made up by bottle-feeding. It may be stated, in general terms, that as long as each breast can be stimulated by nursing three times in the twenty-four hours, either singly in rotation or both together, lactation may be maintained. If the gland is stimulated less frequently its activity quickly declines.

Occasionally the mammary gland fails to assume functional activity, or more often the amount of milk furnished is so small, even under every means of stimulation, that breast-feeding from the beginning is practically impossible; but this is very exceptional. In some instances this defect seems to be transmitted from a mother to her daughters and grand-daughters, but it is questionable whether the family tradition may not lead to an unnecessary lack of faith on the part of the mother as to her powers, and even have a positive effect on her secretion. Such a mother is apt to recommend bottle-feeding at every opportunity, and the doctor is apt to acquiesce.

When satisfactory lactation has been established, a period of danger comes when the mother gets out of bed, even more so when the nurse leaves too soon and the responsibility is thrown upon inexperienced shoulders. Violent emotions may temporarily disturb lactation seriously.

Milk 'disagreeing' with the baby can often be explained by temporary disturbance in its normal composition, for which the normal corrective measures have been mentioned. Cases are not infrequently encountered, however, in

which the mother's milk, for no reason discovered by analysis, is constantly rejected by the baby, whilst a cow's-milk modification is retained and digested. Unusual substances are probably being constantly excreted, or toxins, or disturbance in the proportion of fatty acids may be responsible. Such unexplained cases may have to be met by artificial feeding.

During menstruation the milk usually shows a marked diminution in fat, less in sugar, and increase in proteids. In some cases equilibrium is regained quickly, in others more slowly; but with careful observation menstruation is no contraindication to breast feeding. Pregnancy, however, usually increases the fat content and diminishes the proteids, and the child loses weight.

REFERENCES.—¹*Euston Med. and Surg. Jour.* 1918, ii, 35; ²*Lancet*, 1918, ii, 55; ³*Jour. Amer. Med. Assoc.* 1918, Nov. 2; ⁴*Amer. Jour. Obst.* 1918, July, 52.

INFANTILE DIARRHŒA. (See DIARRHŒA, INFANTILE.)

INFANTILE PARALYSIS. (See POLIOMYELITIS.)

INFANTS, ACUTE ILEO-COLITIS IN. (See ILEO-COLITIS.)

INFANTS, USE OF THE LONGITUDINAL SINUS FOR DIAGNOSIS.

Frederick Langmead, M.D., F.R.C.P.

Brown and Smith¹ report 100 cases in which the sinus has been used for the purposes of diagnosis and therapeutics. Blood was withdrawn for the Wassermann reaction in thirty-nine cases of infants of ages ranging from birth to two years and five months. In these cases, and in the others of the series, three alternative sites of entry were chosen: (1) The anterior angle of the fontanelle; (2) The posterior angle; (3) Along the line of the sagittal suture at a distance of $\frac{1}{2}$ in. to $1\frac{1}{2}$ in. behind the fontanelle. They have been equally successful in all these sites, and state that usually one has no advantage over the others; they merely provide alternative routes if difficulties are encountered at the first attempt. Diphtheria antitoxin was administered in this way in two cases, and they think that it may afford a valuable means of saving lives which might otherwise be lost. Therapeutically, the procedure has been most employed for giving intensive treatment to syphilitic infants. Fifty-two injections of arsenical salts were so given without evidence of irritation or other local disturbance, except perhaps in one case where possibly adhesions or thrombosis occurred, but which went on, nevertheless, to complete recovery, and repeatedly gave a negative Wassermann reaction. This was the first case in which diarsenol was injected into the sinus, and the authors feel justified in concluding that thrombosis practically never occurs in the sinus as it does in the small veins after similar injections. Four infants were infused by way of the sinus with saline solution, using a 20-c.c. syringe. It was found that by putting petrolatum on the nozzle of the syringe, and with an assistant preventing the needle from turning by means of artery forceps, the syringe could be removed from the needle and replaced without difficulty. Judging from these cases, there seemed no doubt that an infant could be given 100 c.c. or more of blood in a few minutes, and the treatment could be carried out at the bedside with only a few minutes' preparation. As an evidence of the ease and rapidity of the procedure, it is stated that four injections of diarsenol were given by one of the authors in fifteen minutes, which included the preparation of each dose and the preparation of the infant.

Blood was removed in three cases for cultural purposes by the Rosenau method. No difficulty was encountered in obtaining sufficient quantity, and the part was easily prepared and rendered aseptic.

REFERENCE.—¹*Amer. Jour. Dis. Child.* 1917, June (abstr. *Ther. Gaz.* 1917, Oct., 726.

INFLUENZA.

J. D. Rolleston, M.D.

Epidemiology.—Since the pandemic of influenza in 1889-92, no disease has shown so wide a distribution or spread so rapidly as the pandemic of influenza which appeared in the spring of 1918 and in a few weeks passed all over Europe. The first appearance of the disease in Spain caused it to be known as 'Spanish influenza' in contrast with the 'Russian influenza' of previous epidemics. Not only has every country in Europe been affected, but severe epidemics have occurred during the year in South and West Africa, India—especially Bombay,—Australia, South America, West Indies, Canada, and the United States. On its first appearance the disease was characterized by its short duration, rapid convalescence, and low mortality; but from July onwards respiratory complications became increasingly frequent and serious, and the mortality rose considerably.

Sir Arthur Newsholme¹ states that during 1918 influenza followed a course never previously experienced. Until towards the end of June the London curve showed but scant mortality from it, the number of deaths weekly between the eighteenth and twenty-fifth weeks varying from 5 to 10. In July influenza was widely prevalent, and was causing excessive mortality, not only in England, but also all over Europe, in the United States, in the great cities of India, and elsewhere. During six weeks in July and August the weekly deaths in London ranged from 38 to 287; and in the following weeks there was a decrease, the deaths ranging from 9 to 21. In the forty-first week there was a sudden increase to 80, and in the following weeks the deaths numbered 371, 1256, 2458, and 2433.

An editorial in the *New York Medical Journal*² of November 16 states that though New York escaped with a smaller number of cases and deaths in proportion than other cities, the epidemic caused 15,000 deaths in one month. Never before had so many deaths occurred in a corresponding period. This record, however, was very much better than that of most of the other cities in the United States. During the height of the epidemic the total death-rate per 1000 of the population was 158 in Philadelphia, 148 in Baltimore, 109 in Washington, 100 in Boston, and only 60 in New York.

A comparison of the pandemic of 1918 with that of 1889-90 is made by Manges,³ who notes the following differences: (1) In the pandemic of 1889 there was the utmost variety, whereas in the present epidemic the only thing that varies is the severity of the symptoms. (2) In 1889 all ages were affected, and the disease was not limited so much as at present to early adult life. (3) Ear involvement, such as otitis, mastoiditis, and sinusitis, as well as neuritic manifestations and psychoses, were quite common in 1889 and exceptional in 1918. (4) Nephritis was very common in 1889, while in 1918 only mild febrile changes were found in the urine, and much less albuminuria than in 1889. (5) The frequency of pneumonia is much greater in the present pandemic. In 1889-90, among 55,263 cases of influenza in the Prussian Army, there were only 534 cases of pneumonia, or 1 per cent, whereas in the present epidemic the pneumonia incidence in the United States Army camps was 10 per cent. The extreme contagiousness of the disease has been proved to be due to aerial convection, the infective secretions from the respiratory passages being conveyed from the sick to the nose and throat of the healthy, in the form of a fine spray, by coughing, sneezing, or even loud talking.

Bacteriology.—According to the authoritative memorandum published by the Royal College of Physicians, London, in November, 1918,⁴ "the nature of the virus is still uncertain. The bacillus discovered by Pfeiffer, commonly known as the influenza bacillus, has in the past been regarded as the probable cause, though on insufficient evidence. There is doubt as to the primary

cause it plays in the disease, important though it probably is as a secondary infecting agent. Pfeiffer's bacillus, the pneumococcus, and above all—in this epidemic—the streptococcus, seem to be responsible for most of the fatal complications of influenza." A similar opinion as to the primary etiological significance of Pfeiffer's bacillus was expressed at a conference on preventive vaccination for influenza held at the War Office, October 14, 1918,⁵ when the conference decided that the existence of some as yet undiscovered virus must be regarded as possible. They had, however, no doubt as to the very frequent presence of Pfeiffer's organism in the epidemic, nor as to the great importance of the part which it played in the production of the symptoms and complications of the disease.

Recent experiments on monkeys by C. Nicolle and C. Lebailly,⁶ which have been confirmed by those of H. Graeme Gibson, F. B. Bowman, and J. I. Connor,⁷ indicate that the infective agent of influenza is a filter-passing organism, and that the virus does not occur in the blood either in man or monkeys. The last-named writers inoculated two rhesus monkeys subconjunctivally and intranasally with the filtered sputum from human influenza, and the animals became ill on the sixth and seventh day respectively; one rapidly recovered, all the symptoms disappearing by the third day of the attack. The necropsy on the other animal, which was killed on the afternoon of the third day, showed the presence of a hæmorrhagic exudate affecting especially the lower lobes of both lungs, a condition resembling that found in human influenza.

Morbid Anatomy.—According to Douglas Symmers,⁸ the naked-eye and microscopical changes in the so-called Spanish influenza present a characteristic picture. This is particularly true of the pneumonic process, which differs considerably from the pneumonias of sepsis, or croupous pneumonia. The lesions are characterized by their bilateral distribution, the early and almost complete involvement of both lower lobes, the almost unailing absence of pleural exudate, the characteristic blue slate-colour of the older areas of consolidation, the patches of acute emphysema, the presence of numerous hæmorrhages, the smooth, almost velvety appearance of the cut surface of the consolidated portions, and the total absence of fibrin in the alveoli.

Lubarsch⁹ found that though the larynx, apart from occasional œdema of the epiglottis and upper third of the trachea, showed no involvement in the process, the lower portion was the seat of an intense mucopurulent exudation which in many cases assumed a purulent character, with the consequent formation of extensive pseudo-membranes in the lower trachea and down into the bronchi.

Shore¹⁰ found that one of the most striking features in the morbid anatomy of influenza is the constant occurrence of dilatation of the *heart*, accompanied by nearly as constant myocardial changes. Twenty-nine out of thirty cases examined by him showed marked dilatation of the heart, chiefly affecting the right side, but very commonly the left side as well.

According to Symmers, the *kidneys* are increased in size, reddish or bluish in colour, the capsule is tense and strips easily, leaving a lustreless, injected surface, the substance bulging noticeably beyond the cut edge of the capsule. Microscopical examination shows a widespread cloudy swelling of the epithelium, most noticeable in the convoluted tubules. In cases of jaundice, which occurs in a small percentage of all cases of pneumococcal lobar pneumonia, the mucous membrane of the duodenum is deeply congested and swollen, and the exit of bile through the papilla of Vater is impeded.

In view of the marked decrease of blood-pressure in the majority of cases of fatal bronchopneumonia, E. S. Winter¹¹ examined the *suprarenals* in three typical cases of influenzal bronchopneumonia, and found them to be very

disintegrated by hæmorrhages through the three layers of the cortex; the cells showed marked cloudy swelling and in many cases a fatty change.

Out of 44 cases in which he examined the central nervous system, Schmorl¹² found hæmorrhagic encephalitis in 15. The white substance of the cortex, and both the grey and white of the central ganglia, abounded in punctiform hæmorrhages, the posterior part of the corpus callosum being most affected. The cerebellum, pons, and medulla were only occasionally involved.

SYMPTOMS.—Writing from their experience of over 500 cases, H. W. Berg and J. G. N. Bullowa¹³ classify the cases in the present pandemic into three groups: (1) Cases with predominating inflammatory disturbance of the upper respiratory tract; (2) Those with predominating pulmonary symptoms; (3) Those in which the constitutional toxic symptoms are the predominating factors.

The following symptoms are present in all the cases to a greater or less extent: chills or chilly sensations, fever, prostration, pain throughout the body and limbs, headache, rhinitis, conjunctivitis, and cough. The patient frequently complains of a peculiar pain or feeling of distress below the lower sternum and above the diaphragm. It has been attributed to involvement of the sympathetic nervous system or to congestion of the mucous membranes of the trachea and bronchi. The headache is uniformly in the frontal region and upper anterior part of the skull. It resembles very much the pain of typhoid fever. The headache and cough are responsible for most of the sleeplessness. In this epidemic, rhinitis, conjunctivitis, and pharyngitis are often very slight or entirely absent, and are very much less marked than in ordinary influenza. The fever curve in an uncomplicated case is fairly constant in its general course. On the first day it may attain 103°, on the second day 104°, dropping on the third day to 103°, and by rapid lysis to normal on the fifth day. In very mild cases there is a drop to normal by crisis on the third day. Owing to the mildness of the nasopharyngeal involvement there have been remarkably few complications in the ears and eyes and tracts leading to these organs.

The *pneumonia* is generally situated at the bases of the lungs, rarely at the apices, occasionally in the scapulovertebral space on either side. The posterior surfaces are more apt to be involved than the anterior. Entire lobes and even an entire lung may be consolidated. The pulse-rate is not so rapid as in pneumonia of a similar kind in other conditions. The respirations barely exceed forty in the adult, except in fatal cases. Pleurisy is frequent, but pleural effusion and empyema are exceptional.

According to E. Rivaz Hunt,¹⁴ influenzal pneumonia is of a mixed lobar and bronchopneumonic type. Several large patches of consolidation may be found, but not as a rule at the extreme bases of the lung. A favourite situation appears to be in the axilla or middle third of the lower lobe. In some of the influenzal pneumonias, toxæmia is severe, and death occurs rapidly from acute heart failure.

A new type of influenza frequently met with in the present epidemic is described by W. Collier.¹⁵ Within a few hours of the onset the temperature runs up to 105° or more, while the pulse is about 90; the lips and face show marked cyanosis, and epistaxis is frequent. In the course of a day or two the patient begins to spit up a quantity of frothy sputum tinged with bright blood. The cardiac dullness is not increased, and there is no evidence of distention of the right side of the heart. At first the physical signs are very indefinite, and point to capillary bronchitis rather than to bronchopneumonia, but signs of consolidation may develop later.

A hypothermic form of influenza is described by Sanz,¹⁶ the characteristic

features of which are not only absence of fever, but the persistence of a sub-normal temperature; a scarcity of respiratory symptoms, which are usually confined to the upper respiratory tract; intense pain in the fauces; aphonia, and a paroxysmal cough accompanied by spasm of the glottis. A similar condition is described by Becher¹⁷ under the names of influenzal equivalents, which he applies to afebrile disorders frequent during an epidemic, and including mild pharyngitis, catarrhal sore throat, coryza, conjunctivitis, slight gastric disturbance, and giddiness.

The various types of influenza seen in infants and children in the current epidemic are described by L. Fischer.¹⁸ The mild cases characterized by slight fever, rhinitis, and catarrhal discharge from the bowel resembling colitis are most dangerous to the community because they are unrestricted. Fischer has met with peripheral neuritis in over 33 per cent of his cases. A severe type characterized by gastro-enteric disturbance simulating acute milk infection in midsummer has frequently occurred in this epidemic. Fischer also describes a hæmorrhagic type in which purpuric spots were scattered over various portions of the body. Petechiæ were noted round the arms, elbows, and knees, and ecchymoses were observed on the roof of the mouth, on the gums, and conjunctivæ. The stools contained specks of blood or consisted of pure blood.

A characteristic feature of the disease, to which several writers draw attention, is the *slow pulse*. In an epidemic reported by Dugrais and Lemaire¹⁹ bradycardia was present in all the cases, the pulse hardly ever being above 40 to 50 in the minute when the patient was recumbent: as soon, however, as he stood up, it rose to 80 or 110. The bradycardia also disappeared under the influence of atropine, the pulse rising to 90 or above. Koepchen found²⁰ that the pulse remained slow for several days after the fall of the temperature, and that the bradycardia was accompanied by a pronounced fall of blood-pressure. According to Dugrais and Lemaire the blood-pressure was always low from the first in severe cases, falling to 60 mm. and even 50 mm. Sometimes the fall of blood-pressure did not occur till late, and persisted or even increased after the temperature had become normal.

The frequency of *nephritis* in cases of any severity, and the constancy of very severe acute nephritis in fatal cases, are emphasized by Sofré,²¹ of Naples, who had the opportunity of observing several hundred cases of influenza in Calabria. (*See also 'Prognosis,' infra.*)

The *gastro-intestinal form* of the disease has been comparatively rare in this epidemic, and the experience of Bezangon²² has been exceptional. He found among soldiers and munition workers in some areas of France a predominance of gastro-intestinal symptoms, with sudden onset and rapid spread of the disease, which at first suggested the possibility of food-poisoning.

The *nervous and mental disturbances* of influenza are fully considered by Smith Ely Jelliffe,²³ who gives instances of involvement of the cranial and spinal nerves, severe neuralgias, polyneuritis, polio-encephalitis, neurasthenia, and various psychoses.

Skin.—Several writers have noted the occurrence of rashes in this pandemic, especially scarlatiniform eruptions. Morelli²⁴ states that an exanthem was present in almost all his cases at an early stage. It was polymorphous in character, sometimes assuming a diffuse erythematous form, and localized on the face, trunk, and upper limbs, but hardly ever on the hands and rarely on the lower limbs. In some cases it closely resembled measles, but was not followed by desquamation. In others it assumed the form of *urticaria*, or *erythema nodosum*, or affected the distribution of a prodromal rash of small-pox in the axillæ, hypochondrium, and groins. In Cole's²⁵ cases a military

sudaminal eruption was very frequent, patchy purpura and punctate erythema were occasionally seen, and interstitial emphysema was found in twelve cases.

Pelz²⁶ found that relapses occurred in 7 to 8 per cent of his cases after an apyrexial interval of one to two days, but only lasted a couple of days. As a rule one attack of influenza confers a certain degree of immunity. The Influenza Commission of the Académie de Médecine²⁷ record that in an artillery regiment consisting of three groups, in the first group there were only 3 cases in April and 114 in August; in the second group there were 20 cases in April and 59 in August; and in the third group there were 100 cases in April and only 3 in August. Similarly, in the Bavarian army of occupation, von Seydel²⁸ relates that in the summer there was a morbidity of 16 per cent with a mortality of 0.5 per cent, whereas in October the morbidity fell to 5.8 per cent and the mortality rose to 3.8 per cent.

The Blood.—According to Citron,²⁹ there is a well-marked leucopenia in all uncomplicated cases, the polymorphonuclears being chiefly affected. In most of Citron's cases the polymorphonuclear percentage was 30. Levy,³⁰ who examined the blood of 42 cases, found that the diminution of the polymorphonuclears was accompanied by an increase in the lymphocytes, especially of the large mononuclears, which sometimes numbered as much as 21 per cent. Leucocytosis was always found to be due to the presence of complications, and its absence in a complicated case is of bad omen. The constancy of leucopenia in this pandemic except in complicated cases is also noted by Koepchen and Bittorf.³¹ In the pandemic of 1889-90, on the other hand, hyperleucocytosis was the rule, being probably due to the frequency of mixed infections.

DIAGNOSIS.—Owing to the acute onset, with shivering and cough, the disease may bear a close resemblance to *central pneumonia*, from which it can be distinguished by x-ray examination (Hesse³²). It may also be mistaken for *abortive typhoid* or *paratyphoid*, which it resembles in the course of the fever, the headache, bradycardia, leucopenia, enlargement of spleen, and digestive disturbances such as diarrhoea and constipation. According to the Influenza Committee of the advisory board to the D.G.M.S. France,³³ the point of chief importance in distinguishing influenza from a certain form of *trench fever* is the epidemic character. When considerable numbers of a unit are affected simultaneously, it may be assumed at once that the disease is not trench fever. The pulmonary and renal complications form a further distinction, the sequelæ in trench fever being almost entirely confined to the heart. Lastly, true shin pains, which are common in trench fever, are hardly ever observed in influenza, in which the pains are seldom felt below the knees. There is sometimes a difficulty in diagnosing influenza from *scarlet fever* owing to the acute onset, with sore throat, headache, vomiting, and the occasional occurrence of a scarlatiniform rash. The difficulty is still further increased if hæmorrhagic nephritis occur. As a rule, however, the rash is much more patchy in distribution than in scarlet fever, and the appearances of the tongue and throat characteristic of that disease are absent.

PROGNOSIS.—According to C. E. Cooper Cole,²⁵ early cyanosis, high fever, and rapid respiratory rate are usually unfavourable symptoms, all being evidence of severe toxæmia. A relatively slow pulse-rate is not necessarily favourable, though a high rate is always ominous. Development of local septic foci promises favourably; leucocytosis is usually favourable. Delirium may be intense early in the case, and completely disappear, the patient becoming perfectly rational. Bronchopneumonia is always serious.

A. Maude³⁴ found that several of the most seriously affected were the subjects of previous acute or chronic bronchitis. M. Manges thinks that the

prognosis should always be guarded when influenza occurs in a pregnant woman or in persons who have healed or latent tuberculosis, as in both these classes the mortality is unusually high.

Dalimier³⁵ attaches considerable prognostic importance to the state of the kidneys, having found that the severe and rapidly fatal cases were those in which there had been a large quantity of albuminuria. He maintains that every patient whose kidneys are healthy may recover, in spite of concomitant septicæmia and pulmonary or pleural complications, whereas a patient with a large quantity of albumin is very likely to succumb. Sir John Moore³⁶ also measures the gravity of a severe attack by the intensity of the albuminuria.

PROPHYLAXIS.—The following recommendations were made by the commission of the Académie de Médecine appointed to consider the prophylaxis of influenza²⁷ :—

1. Avoid all contact with infected persons, and carry out a careful antiseptics of the mouth and nasopharynx. Opportunities for contagion are especially frequent in crowded places of resort, particularly badly lighted and ventilated assembly rooms, theatres, and cinema palaces, which should therefore be avoided. Underground railways and other public conveyances are equally favourable for the spread of the disease ; as their use cannot be suspended or overcrowding be prevented at the present time, they should be disinfected as frequently and completely as possible.

2. Cases of influenza should be isolated from one another and from visitors. It is always advisable to separate simple from complicated cases, both in hospital wards and in private houses. To prevent overcrowding in the wards, convalescents who have escaped all respiratory complications should be sent to a special ward as soon as possible. Masks should be worn by the medical and nursing staff and by the patients themselves as soon as they begin to get up.

3. Admission to influenza wards should be forbidden except in urgent cases, and a special staff should be appointed for duty in these wards. The mechanical prophylaxis of influenza by the use of a mask consisting of a gauze hood provided with a transparent eye-piece is advocated by Vincent and Lochon,³⁷ who regard a covering for the mouth and nose only as inadequate, as it does not protect the conjunctivæ, which are so commonly the seat of the first manifestations.

The memorandum of the Royal College of Physicians¹ advises by way of personal prophylaxis that the throat should be gargled every four hours, if possible, or at least morning and evening, with a disinfectant gargle, such as 20 drops of *Liquor Sodæ Chlorinatæ* in a tumbler of warm water, and that a *Solution of Sodium Chloride*, one tablespoonful to the pint of warm water, should be sniffed up from the hollow of the hand two or three times a day. As the virus of influenza is very easily destroyed, extensive disinfection is not required. Sputum should be received in a glazed receptacle containing a solution of chloride of lime. Discarded handkerchiefs should be immediately placed in a disinfectant, or, if of paper, burnt. The closing of schools in a large city in the presence of an epidemic is regarded by an American writer³⁸ as a measure of doubtful utility. In smaller places this is more reasonable, and the danger of infection where children are out-of-doors should be less than when they are brought together in a schoolroom.

The prevention of influenza among the staff of naval ambulance trains by administration of Quinine, gr. 5, and gargles of Eusol, Permanganate 1-5000, or Potassium Chlorate and Carbolic Acid, and spraying the inside of the train with Izal, is described by K. H. Jones,³⁹ who records how on four occasions thirty-nine healthy individuals were in close contact for several hours with

large number of actively infectious cases of influenza and escaped infection as the result of these precautions.

A **Preventive Vaccine** of the following constitution and dosage is recommended by the War Office Committee⁵ :—

	First Dose.	Second Dose.
B. influenzae ..	30 million	60 million
Pneumococcus ..	100 „	200 „
Streptococcus ..	40 „	80 „

Whenever possible, both doses of the vaccine should be given at intervals of ten days. In the case of soldiers, a period of twenty-four to thirty-six hours' light duty should always be given.

Children under three years should not be inoculated. For older children the following doses should be given : From 3 to 7 years, a quarter of the full dose ; 7 to 16 years, half the full dose ; above 16, the full dose.

TREATMENT.—The following suggestions as to treatment were issued by the War Office to officers in charge of hospitals and medical officers of units on October 30, 1918 : “ Bed is essential in all cases, however mild they may be . . . The patient should be kept in bed for at least two days after the temperature has fallen. . . . Ample fresh air is necessary in the wards. If it is impossible to maintain a temperature of not less than 55°, additional blankets should be provided. . . . There is no merit in endeavouring to lower temperature by salicylates or aspirin, though the latter may be given with caution for the easing of head and body pains. Very little drug treatment is required for the simple cases. Simple diuretics and diaphoretics, e.g., **Liq. Ammon. Acet.**, and if there is an irritable cough **Tinct. Camph. Co.** is best. It is not necessary to prescribe quinine for the uncomplicated cases. When there is nasopharyngeal catarrh, gentle irrigation through the nose into the pharynx three or four times a day will be useful. Good solutions are either **Potassium Permanganate** (1–4000) or an alkaline solution such as the following :

R Boracic	Acid. Carbol. Liq.	Mij
Sod. Bicarb.	Aq.	ad 5j
ãã gr. x		

Colour with logwood or methyl orange. To be diluted with 2 oz. of warm water before using.

These solutions should be drawn gently through the nostrils from the palm of the hand. . . . The following observations apply to severe cases : If patients are sleepless, one of the best remedies is 20 gr. of **Bromide** at about 6.0 p.m., and 15 gr. of bromide with 15 gr. of **Chloral Hydrate** three or four hours later. Opiates should not be used to secure sleep, but may be employed where the cough is irritable and exhausting.

“ **Oxygen** should be given in cases threatening to be severe, especially those which have any tendency to blueness. . . . A good plan is to administer it for five or ten minutes every hour, or in some instances for half an hour at a stretch. . . . The blueness prevalent in the bad cases is more the result of toxæmia than true asphyxia or venous engorgement. Venesection is seldom beneficial. **Alcohol** in these severe cases is invaluable, and sometimes needs to be pushed. In the simple uncomplicated cases it is unnecessary.”

Local applications to the chest, such as **Linseed Meal** 8 parts, and **Mustard Poultee** 1 part, every four hours until the skin is reddened, or stimulating liniments like **Camphor**, **Chloroform**, or **Turpentine**, diluted with equal quantity of oil, and used liberally, are recommended by Sir Thomas Horder¹⁰ for allaying the cough. When the origin of the cough is irritability of the upper air passages, he advocates inhalations of **Tinct. Benzoin. Co.**

(4 parts) with **Menthol** or **Eucalyptus** (1 part). In the most intractable cases he prescribes :

R Syr. Chloral

5ss | Ext. Glycyrrhiz. Liq.
Four-hourly for four doses.

℞xx

During the later stages much of the cough is due to irritation of the pharynx, and is to be relieved by 10 per cent aqueous solution of **Argyrol** or **Protargol**, and yet later by the **Iodine and Potassium Iodide Mixture** used by laryngologists, carried well down the trachea (J. Madison Taylor⁴¹).

Various forms of *abortive treatment* have been recommended. More than 2000 cases have been treated by E. B. Turner⁴² with 20 gr. of **Salicin** every hour with exactly the same result, viz., rapid recovery in an average of a day and a half, without any complications, sequelæ, or loss of life. In no case has he seen the smallest ill effects from these large doses. Immediately after the onset of the fever, Marcovici⁴³ gives $4\frac{1}{2}$ to 9 gr. of **Calomel**, followed four and eight hours later by a powder containing $7\frac{1}{2}$ gr. of **Aspirin** and $1\frac{1}{2}$ gr. of **Caffeine**. All cases so treated became free of fever in twenty-four hours and escaped complications. If antipyretic treatment was given without previous intestinal disinfection by calomel, the course of the disease was not affected, nor were complications prevented.

The following treatment is recommended by Bastedo⁴⁴ for cases of *influenzal pneumonia*. Owing to the cardiac weakness and frequent development of auricular fibrillation it is wise to give all patients **Digitalis** in large doses for the first two or three days. If the ordinary hypnotics do not suffice, 2 dr. **Paraldehyde** dissolved in saline should be given per rectum. If there is delirium or much pleuritic pain, morphia may be employed, but its use should be avoided as far as possible owing to its tendency to produce œdema of the lungs and tympanites. In œdema of the lungs the chest should be dry-cupped, and 5 gr. of **Caffeine** and **Sodium Benzoate** should be given to stimulate respiration. If the œdema of the lung is serious, 10 to 15 oz. of blood should be withdrawn. **Oxygen** should be administered freely, and preferably with steam to avoid the drying effect of oxygen.

As the gravity of influenza lies almost entirely in its complications, most of which he found were due to the pneumococcus, Violle⁴⁵ has systematically given **Antipneumococcal Serum** to all his influenza cases, just as antitetanic serum is given to all wounded men : 20 c.c. of the serum are injected subcutaneously in each thigh. To avoid anaphylaxis, 1 c.c. of the serum is given subcutaneously at least four hours before the 40 c.c., together with 40 gr. of **Calcium Chloride** internally. For the treatment to be successful the following two conditions must be fulfilled : (1) The causal agent of the pulmonary complications must be the pneumococcus ; (2) The treatment must be commenced as early as possible. If the symptoms do not subside rapidly, a second injection should be given. If the patient has a fully developed double bronchopneumonia, the doses should be increased to 80 or 100 c.c., and repeated if necessary. When the complications appear to be due to streptococci, **Antistreptococcal Serum** should be used. In doubtful cases or mixed infection, a combination of antipneumococcal and antistreptococcal serum is indicated.

Vaccine Treatment.—At the War Office conference⁵ it was decided that the vaccine was most likely to be of service in the treatment of subacute and chronic cases, the initial dose being one-fifth of the 'first dose' recommended for preventive treatment. (See 'Prophylaxis.') The vaccine should not be used in severe cases of secondary bronchopneumonia in view of the dangerous rapidity and severity of many such cases ; but, if it is employed, the initial dose should not exceed one-twentieth of the 'first dose.'

REFERENCES.—¹*Lancet*, 1918, ii, 689; ²*N. Y. Med. Jour.* 1918, ii, 869; ³*Ibid.*, 722; ⁴*Brit. Med. Jour.* 1918, ii, 546; ⁵*Lancet* 1918, ii, 565; ⁶*Brit. Med. Jour.* 1918, ii, 495; ⁷*Ibid.*, 645; ⁸*N. Y. Med. Jour.* 1918, ii, 621; ⁹*Med. Suppl. Rev. Foreign Press*, 1918, 356; ¹⁰*Brit. Med. Jour.* 1918, ii, 508; ¹¹*Ibid.*, 620; ¹²*Med. Suppl. Rev. Foreign Press*, 1918, 357; ¹³*N. Y. Med. Jour.* 1918, ii, 624; ¹⁴*Lancet*, 1918, ii, 419; ¹⁵*Ibid.*, 567; ¹⁶*Med. Suppl. Rev. Foreign Press*, 1918, 445; ¹⁷*Med. Klin.* 1918, 1009; ¹⁸*Med. Rec.* 1918, ii, 793; ¹⁹*Med. Suppl. Rev. Foreign Press*, 1918, 386; ²⁰*Ibid.*, 386; ²¹*Ibid.*, 385; ²²*Ibid.*, 359; ²³*N. Y. Med. Jour.* 1918, ii, 385; ²⁴*Med. Suppl. Rev. Foreign Press*, 1918, 445; ²⁵*Brit. Med. Jour.* 1918, ii, 566; ²⁶*Deut. med. Woch.* 1918, 1107; ²⁷*Bull. Acad. de Méd.* 1918, lxxx, 317; ²⁸*Münch. med. Woch.* 1918, 1305; ²⁹*Med. Suppl. Rev. Foreign Press*, 1918, 383; ³⁰*Ibid.*, 386; ³¹*Ibid.*, 340; ³²*Brit. Med. Jour.* 1918, ii, 506; ³³*Lancet*, 1918, ii, 324; ³⁴*Bull. Acad. de Méd.* 1918, lxxx, 456; ³⁵*Lancet*, 1918, ii, 602; ³⁶*Bull. Acad. de Méd.* 1918, lxxx, 348; ³⁷*Jour. Amer. Med. Assoc.* 1918, ii, 1137; ³⁸*Brit. Med. Jour.* 1918, ii, 573; ³⁹*Lancet*, 1918, ii, 694; ⁴⁰*N. Y. Med. Jour.* 1918, ii, 847; ⁴¹*Brit. Med. Jour.* 1918, ii, 112; ⁴²*Wien. klin. Woch.* 1918, 994; ⁴³*N. Y. Med. Jour.* 1918, ii, 626; ⁴⁴*Presse Méd.* 1918, 525.

INANITY. (See MENTAL DISEASES.)

INSECT BITES.

Aloes recommended (p. 2); Garlic (p. 3).

INTESTINAL STASIS. (See TOXÆMIA, ALIMENTARY.)

INTESTINES, SURGERY OF. (See also HERNIA.)

E. Wyllys Andrews, A.M., M.D.

Tuberculosis.—Carlson¹ describes the clinical aspect of tuberculous mesenteric glands, and insists that the frequency of this disease is greater than is commonly believed. Symptoms are so elusive as generally to be classed with indigestion. In the Royal Hospital for Sick Children, Edinburgh, Fordyce reports this as an extremely common disease, having been found 10 times in 50 consecutive autopsies. On the other hand, Goodhart and Still say that, although 59 per cent of post-mortems show tuberculosis of these glands, only 46 cases out of 6000 gave clinical symptoms. Carlson thinks the origin may be an infection, oftentimes in the throat and neck glands, or the swallowed sputum of pulmonary tuberculosis. Often, however, there is no other focus in the body. It is most common from five to fifteen years of age. Thirty of these cases gave a history of two or more years' illness, the main symptom being pain. This symptom is very typical; it is a sudden, centralized abdominal pain, making the child cry for about fifteen minutes unless relieved by pressure or hot applications. The treatment of these cases is often best surgical; 16 were complicated by appendicitis. The abdomen is opened in the mid-line below the umbilicus, and the mesentery examined to remove caseating or calcareous glands. This should be done thoroughly. The bowels should be examined for ulcers or kinks, the appendix being removed almost as a routine. The writer has been able to follow up his cases, and reports the late results as 13 cures out of 47 operations.

William J. Mayo² discusses tuberculous disease of the bowel, its origin, and treatment. He advocates early removal of the primary focus where possible. Barker's statistics are quoted, showing that 50 per cent of these cases are bovine tuberculosis, and this corresponds with the English Commission on Tuberculosis, 1911, which showed 47 per cent bovine, and 63 per cent in general European clinics. Mayo thinks simple laparotomy is curative, and does not agree with the English school in insisting on drainage. He believes the accumulated fluid has a high opsonic index and marked sterilizing properties. It must not be forgotten that pleurisy and pericarditis may co-exist with this condition.

Intussusception.—Graham³ discusses acute intussusception of the colon in an adult. This is much less common than in children, but 2 cases have come under his observation. Both were operated upon promptly, and an excellent recovery followed.

Romanis⁴ reports the operations for intussusception in St. Thomas's Hospital. The paper is based on 374 cases treated during twenty years. The mortality was 121, or 32 per cent. However, classifying by five-year periods, the mortality of the last series was lower than the first, being but 19 per cent. At present it is considered in this institution that the cases should be entirely operative, air and water injection being abandoned. After opening the abdomen, it is to be found whether the intussusception is reducible, or irreducible and gangrenous, the latter requiring resection. In desperate cases an artificial anus may be formed above the invagination. Special efforts must be made to avoid shock, by early operation, short anæsthesia, and very careful after-treatment.

S. W. Daw⁵ describes a new instrument for certain steps of the operation for intussusception. As seen in *Figs. 61-62*, this instrument consists of two

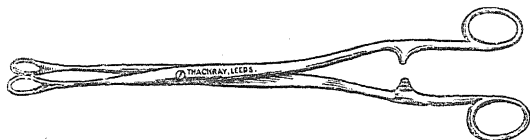


Fig. 61.—Daw's forceps for intussusception.

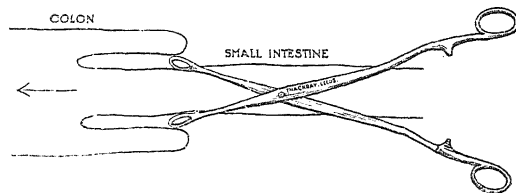


Fig. 62.—Daw's forceps being applied.

slender hollow blades, which can be made to grasp the invaginated part of the bowel and assist in its withdrawal. With the aid of this appliance Daw has been able to reduce cases which otherwise would have required resection of the bowel.

Intestinal Obstruction.—Charles H. Mayo⁶ speaks of the value of jejunostomy in cases of obstruction high up. After this procedure the stomach may be washed out freely, and nutrient fluids introduced through the jejunostomy tube. This was often of great value in extensive carcinoma of the stomach.

Giant Duodenum.—Downes⁷ describes a case of giant duodenum, analogous to megacolon or Hirschsprung's disease. The affection is rare, and is very well illustrated in the skiagram furnished. The best operation for this affection is duodeno-jejunostomy, as first suggested by Bloodgood. This operation was performed 14 in. below the first portion. The patient did not survive, and an autopsy showed thrombosis of some of the mesenteric vessels.

Meckel's Diverticulum.—Professor Kirrison,⁸ reports several cases of Meckel's diverticulum requiring operation. The symptoms in all of these were somewhat the same—severe pain near the umbilicus as in umbilical hernia. In the three cases reported, recovery followed removal of the diverticulum, and even in newly-born infants the interference was well borne.

Cæcum and Colon.—Sir William Watson Cheyne⁹ reports cases of what he terms cæco-plication, or narrowing of the cæcum, for dilatation and pain. This is applied mostly to cases which have not been relieved by appendectomy, possibly because the appendicitis was only part of the general colitis. The

three longitudinal bands of the colon are continued on the cæcum, where they meet in the attachment of the appendix. At this point the three bands were sutured together, so as to plicate the colon and narrow its lumen.

Gordon Taylor¹⁰ advocates temporary cæcostomy in resection of the colon. He finds this little manœuvre of great service: first, in resection of the large intestine for carcinoma; second, as a step in the closing of a proximal ileocolostomy for penetrating wounds. A number of cases are reported in which this step was of great value.

William J. Mayo¹¹ advocates transperitoneal sigmoidotomy for benign tumours, polyps, and the like, of the large intestine. The bowel having been freely opened, its interior can be explored with safety, and its lumen again closed securely by multiple suturing. (*Plate XXII.*)

REFERENCES.—¹*Lancet*, 1918, June 22; ²*Jour. Amer. Med. Assoc.* 1918, July 6; ³*Edin. Med. Jour.* 1918, Sept.; ⁴*Pract.* 1918, Sept.; ⁵*Lancet*, 1918, June 8; ⁶*Journal-Lancet*, 1917, Dec. 15; ⁷*Ann. Surg.* 1917, Oct.; ⁸*Med. Press and Circ.* 1917, Oct. 31; ⁹*Lancet*, 1918, June 15; ¹⁰*Brit. Med. Jour.* 1918, June 15; ¹¹*Ann. Surg.* 1917, July.

INTUSSUSCEPTION. (*See* INTESTINES, SURGERY OF.)

JAUNDICE, INFECTIVE.

J. D. Rolleston, M.D.

ETIOLOGY.—According to M. H. Neill,¹ who deals with the problem of infective jaundice in the United States, probably 10 per cent of all wild rats carry the *Spirochaeta icterohæmorrhagiae* in their kidneys, and excrete them in their urine. If this organism finds a favourable environment in the soil, a sufficient number may live long enough to infect a human being who gets them in the mouth or on the skin. C. Herrman² thinks that the infectious material probably enters the body through the nasopharynx, is then taken up in the circulating blood, and has a selective affinity for the bile-ducts. The disease is probably a primary infection of the liver, not an ascending infection from the duodenum. It is not due to indiscretions in diet, and there is no conclusive evidence that the infectious material is conveyed by food or water. It is probable that the infection usually takes place by direct contact, but occasionally it may occur indirectly through infected urine or fecal matter. The disease is only slightly communicable, for apparently most individuals enjoy a natural immunity. One attack renders a patient immune to further attacks. In civil life, sporadic and epidemic jaundice is commoner in children (*MEDICAL ANNUAL*, 1915, p. 347), probably because they are more susceptible and have not been immunized by a previous attack. In camps the disease is most common among recruits from rural districts, because a certain number of non-immune or susceptible individuals are brought into close contact.

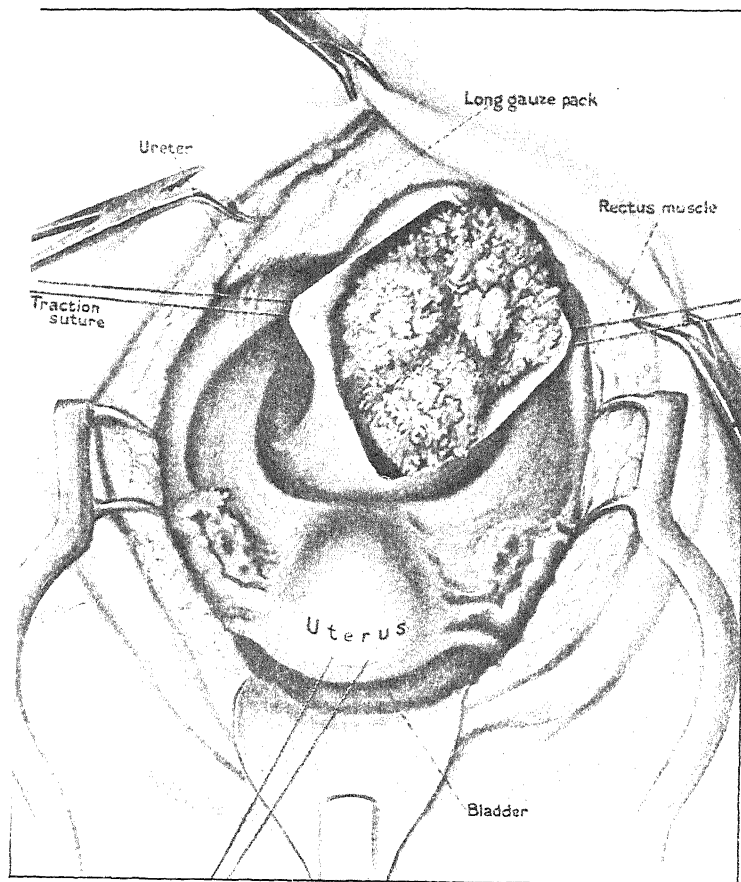
Further evidence is accumulating to show that rats may serve as the reservoir of the virus in places where human spirochaetal jaundice is not present, as at Tunis, when Nicolle and Lebaill³ found infected rats in the slaughter-houses; at Lyons, where Courmont and Durand⁴ found the spirochaete present in 8 per cent of the sewer rats, and at Marseilles, where Martin and Pettit⁴ examined 30 large rats and found positive results in 2. Similar investigations were made by Monti⁴ on sewer rats at Bergamo, which has always been free from the disease, and positive results were obtained in several cases.

Fiessinger⁵ proposes the term 'French spirochaetosis' for a condition which is distinguished from the spirochaetosis icterohæmorrhagica of the Japanese by the non-pathogenicity of the organism, which he calls the *Spirochaeta pettiti*, after Pettit, who first described it. Epidemics of this new spirochaetosis have been observed at Lorient, Udine, and Paris. Fiessinger thinks that spirochaetes found in other conditions, e.g., war nephritis, trench fever, and pyrexia of uncertain origin, belong to this new group.

PLATE XXII.

SURGERY OF INTESTINES

(W. J. MAYO)



Papillomatous growth presenting through the opened sigmoid

Re-made from 'Annals of Surgery'

Outbreaks of epidemic jaundice due to other causes than the *S. icterohæmorrhagica* have frequently occurred in the war, e.g., an outbreak among Italian troops due to paratyphoid B infection (Cappellani and Frugoni⁶), an epidemic due to the same cause in the Roumanian army in 1917 (Cantacuzène⁷), and another among Austrian troops due to a coliform bacillus (Hatiegan⁷).

SYMPTOMS.—Herrman² states that in the epidemics of acute infectious jaundice seen in New York City the cases vary greatly in severity. The vast majority are mild, but severe cases with enlargement of the spleen and albuminuria are also found; hæmorrhage, especially epistaxis, may occur, and even death may result. Except in the degree of severity of the majority of the cases, the disease as seen in New York City differs in no way clinically from that described by Japanese and European observers.

Salvaneschi⁸ records his observations on 276 soldiers suffering from spirochætal jaundice. In the majority of cases there was a rise of temperature from 99·6° to 101·4°, but it was only in a few severe cases that the temperature remained high during the greater part of the disease. Salvaneschi regards this as an important pathognomonic sign, since in simple catarrhal jaundice enlargement of the liver, when it does occur, is a late phenomenon. The spleen was enlarged in 99 cases and normal in 177. The urine was dark in 262 cases, and of normal colour in only 14. In most cases bile-pigment was present, and in a few, albumin. The fæces were discoloured in 156 and normal in 120. They were never completely white as in other forms of jaundice. They were sometimes mixed with blood, but there were never any true hæmorrhages.

Garnier and Reilly⁹ studied the blood-changes in 24 cases of spirochætosis icterohæmorrhagica, with the following results. Anæmia is common, and in severe cases constant. A few red cells show granular degeneration. The lowest red-cell count seen was 1,800,000. The colour-index is a little above unity. The anæmia may develop as early as the fourth day, but in the slight forms it is less marked and does not become obvious until the jaundice is fading. The leucocyte count is always increased, but not greatly; usually it is between 10,000 and 15,000. During the fever there is a polymorphonuclear increase, usually to 85 per cent, which disappears as the fever subsides. In the intervals between the relapses the leucocyte count falls, but returns during the relapses. As in infective febrile conditions, the eosinophils disappear, but they increase to about 5 per cent during convalescence, and this eosinophilia persists for about three months.

Weekers and Firket¹⁰ discuss the ocular manifestations of spirochætosis icterohæmorrhagica, which include simple hyperæmia of the anterior segment of the eyeball, congestion of the iris, iritis with exudation, sometimes forming synechiæ, optic neuritis, retro-ocular neuritis, ocular herpes with corneal lesions, and conjunctival jaundice with subconjunctival hæmorrhages. The ocular complications are also dealt with by Hertel,¹¹ van Schevesten,¹² and Moret.¹³

During March and the following months of 1917, Manine, Cristau, and Plazy¹⁴ observed 40 cases in the naval hospital at Lorient with spirochætosis in the urine, but not in the blood, except in one case. Pettit showed that the spirochæte in these cases was not *S. icterohæmorrhagica*, as it did not infect guinea-pigs or give the immunological reactions of *S. icterohæmorrhagica* (see ETIOLOGY). Various clinical forms were described, viz., hepatic, meningitic, pleuropulmonary, rheumatic, renal, and typhoid. All the cases relapsed once, and some more often. There were four fatal cases—three of the meningitic and one of the 'typhoid' cases. The hepatic form was the mildest.

DIAGNOSIS.—Sir Bertrand Dawson¹⁵ states that during the early stage of spirochætosis icterohæmorrhagica the symptoms are those common to enteric

influenza and trench fever. Hæmorrhages, conjunctival suffusion, and hæmorrhagic herpes should arouse suspicion. Inoculation of a guinea-pig is of small use after the eighth day, but if positive is conclusive. Spirochætes appear in the urine about the ninth day, increasing in numbers towards the fifteenth day, and disappearing at the end of the fifth week. The specific spirochæte is excreted by the kidneys, and must be distinguished from urethral spirochætes of the meatal type. A positive diagnosis must rest on the presence of the typical spirochæte taken in conjunction with the clinical evidence.

Garnier and Reilly¹⁶ consider that the examination of the urine for the etiological diagnosis of infective jaundice should be made at the time when excretion of the organisms usually occurs, viz., from the fifteenth to the twenty-third day of disease, when elimination *en masse* often occurs, and the spirochætes are easily found. In some cases, especially when the icterus is intense and the bile-salts persist for a long time in the urine, only a small number of spirochætes are excreted, and if an examination is not made daily, and the preparations are not scrutinized with sufficient care, the presence of the spirochætes escapes notice.

Martin and Pettit,¹⁷ who have studied Widal's agglutination test in spirochætosis icterohæmorrhagica, have found that the spirochætes were not agglutinated by normal or syphilitic human serum, and that positive results were confirmed by the subsequent course of the disease, inoculation of guinea-pigs, and the reaction of immunisins. In patients who have been infected with the spirochæte for ten days the serum contains agglutinins which act, as a rule, in a dilution of 1-500, sometimes even of 1-1000. The agglutinins do not appear before the tenth day, and are never absent after the third week in spirochætosis icterohæmorrhagica. In spite of the reaction not being obtained until relatively late, it possesses the advantage over other diagnostic methods of being simple, rapid, and conclusive. It is applicable both to convalescents and to persons who have recovered from the disease several months previously.

MORBID ANATOMY.—Sir Bertrand Dawson¹⁵ gives the following description. The duodenal mucous membrane is very œdematous and congested, with a red raised area about the bile-duct orifice. The stomach and first three feet of the jejunum are also inflamed, but less noticeably; the rest of the intestine and common bile-duct, except at its termination, are normal. Many enlarged lymph-glands are found at the edge of the lesser omentum and about the bile-ducts. The ampulla is swollen and congested. In some instances the spirochætal infection is localized in the duodenum, but in others the duodenum shows no change. The morbid changes in the liver vary. Sometimes the naked-eye lesions are ill marked when microscopical section shows cell damage resembling that of acute yellow atrophy. The kidney changes also vary, though not so much. They range between cloudy swelling and disorganization approaching to necrosis. The spleen and pancreas are unaffected, but peritoneal, subpleural, and subpericardial hæmorrhages are common, and hæmorrhages may occur within the lung substance.

TREATMENT.—*Intravenous* injection of **Salvarsan** and the **Serum of Convalescents** and of goats and horses immunized with *S. icterohæmorrhagica* have both given good results when employed early in the disease (Inada, Ino, Ito, Hoki, and Wani¹⁸).

Intramuscular injection of the serum of convalescents proved satisfactory in 40 cases treated by Heidenheim.¹⁹ A slight rise of temperature followed the injection, but otherwise there were no bad results. 30 c.c. of the serum were given on two successive days, and after a day's interval a further injection of 30 to 40 c.c.

REFERENCES.—¹*Med. Rec.* 1918, i, 992; ²*N. Y. Med. Jour.* 1918, i, 1068; ³*Med. Supplement Rev. Foreign Press*, 1918, 213; ⁴*Ibid.* 388; ⁵*Ibid.* 345; ⁶*Ibid.* 138; ⁷*Ibid.* 448; ⁸*Ibid.* 344; ⁹*Ibid.* 93; ¹⁰*Brit. Jour. Ophth.* 1918, 141; ¹¹*Ibid.* 154; ¹²*Ibid.* 156; ¹³*Ibid.* 157; ¹⁴*Med. Supplement Rev. Foreign Press*, 1918, 30, 214; ¹⁵*Lancet*, 1918, ii, 575; ¹⁶*Med. Supplement Rev. Foreign Press*, 1918, 448; ¹⁷*Ibid.* 389; ¹⁸*Ibid.* 11; ¹⁹*Ibid.* 66.

Sir Leonard Rogers, M.D., F.R.C.P.

Further work has been done on the relationship of rats to this disease. A. C. Coles¹ has found spirochaetes morphologically identical with those of *S. icterohæmorrhagiæ* in 9 per cent of rats examined. He has also succeeded in photographing them to show the large number of very minute spirals of this organism. Inada and Ido² have used successfully in the treatment of the disease the Serum obtained from convalescent patients and from actively immunized horses. H. Noguchi³ has infected guinea-pigs with the disease by injecting them with an emulsion of the kidneys of wild rats caught in America. He has cultivated several strains of the spirochaetes, and found that immunization against the Japanese strain also protected against the Belgian and American strains, indicating that all three are identical. P. Nolf and J. Firket⁴ think trench fever and five-day fever may be related to infective jaundice, and possibly also to yellow fever.

REFERENCES.—¹*Lancet*, 1918, i, 468; ²*Edin. Med. Jour.* 1917, Oct., 255; ³*Jour. Exper. Med.* 1917, xxv, 755; ⁴*Arch. méd. Belges*, 1918, April, 380.

JAWS AND FACE, GUNSHOT INJURIES OF.

W. H. Dolamore, M.R.C.S., L.D.S.

Munby, Forty, and Shefford¹ give an analysis of jaw cases treated in Leeds, which are interesting in the absence of more complete statistics. Of 145 cases, 119 were of the mandible, 8 of the maxilla, and 18 alveolar fractures. Of the fractures of the mandible, 26 were in the incisor region, 32 in the canine, premolar, or molar, 21 of the angle, and 10 of the ascending ramus, including condyle and coronoid, and in 6 cases the fractures were multiple. Since the alveolar fractures are not divided into those of the maxilla and of the mandible, it is impossible to deduce the relative number of injuries occurring in the two bones. Excluding these, the figures give a ratio of 6½ mandibular to 1 maxillary fracture. These figures may be compared with those given by Northcroft² of cases at the 1st London General Hospital—mandible 5·5, maxilla 1, maxilla and mandible 0·64, and with Lindemann's for cases at Düsseldorf of 5:1:1. Cases seen in hospital possibly do not give the accurate proportion of injuries. It would seem that if a missile came at such an angle that the mandible was not hit, then in many cases it may penetrate beyond the maxilla and cause death: the more so as the spongy nature of the maxilla would not cause this bone to deflect the bullet with the same frequency as does the more compact tissue of the mandible.

It may be noted that the ratio deduced from the figures given by Heath of gunshot injuries of the German troops in the Franco-German war, 1870-71, is, approximately, mandible 6·3, maxilla 11·9, mandible and maxilla 1.

COMMUNUTED FRACTURES OF THE MANDIBLE.

In the majority of gunshot injuries there is more or less comminution, but in many the particles or fragments remain in sufficient proximity to allow bony union, provided suitable splints are used. In other cases the fragments are much displaced; e.g., those of the lower border are displaced towards the neck, and hence are not in contact with the body of the mandible, which may either not be fractured or, if so, may be fixed at rest by a suitable splint. This downward displacement may be increased if fibres of the depressor

muscles are attached to the fragments. For the correction of this displacement Pickerell³ has designed the 'screw lever splint' shown in *Plate XXIII, A*. To a metal cap splint two arms are soldered. These arms are so bent that they end on both sides slightly below the normal position of the lower border of the mandible. To these ends is hinged a padded lever which revolves on them as an axis. The anterior end of the lever is forced downwards by the pressure of a screw; hence the posterior end presses upwards on the depressed fragment, reducing the displacement. Kazanjian⁴ passes wire ligatures through such depressed fragments; these, after being lifted up, are maintained in position by ligaturing the wires to a dental splint (*Plate XXIII, B*). Whether this is good practice, considering the viability of the fragments is lowered by the injury, is a matter open to discussion, but he claims the method is justified by results. As an accessory support a guttapercha chin-cap is so connected to a skull-bandage by elastic bands that the pull is upwards and forwards. He points out that in the early days, when the correcting force is most needed, the nature and location of the injury do not allow the application of any appreciable force to the soft tissues.

If no teeth be present in the mandible, Pickerell⁵ makes small skin incisions over its lower border, and through these passes screws into the bone. These screws serve as handles to move the fragments into their correct position, and as fixed points for the attachment of a retaining apparatus.

Closure of the Jaws.—A frequent and troublesome condition following jaw injuries, especially those associated with wounds of the soft tissues of the face, is closure of the jaws. The chief causes are (1) contraction of scar tissue, and (2) obliteration of the buccal sulcus. The first group of cases are treated either by gradually stretching the scar tissue by forcing the jaws apart with various mechanical appliances, or by excision of the scar tissue. It is doubted whether the former is of permanent value, since, when treatment has ceased, the scar tissue may again contract; hence the latter method is regarded by many to be preferable, the more so as the removal of such scar tissue is of advantage for cosmetic reasons. Percival Cole⁶ advocates splinting such jaw cases in the 'open bite' position from the first, so that scar contraction may be prevented *ab initio* (*Plate XXIV, A*). The kind of splint employed to maintain this position can vary at discretion and individual preference; but it is essential, if the mucous lining of the sulcus is destroyed, that the splint should have attached a buccal flange to pass into the wound between the cheek and jaw to prevent the union of the two raw surfaces. When closure is due to the latter cause the sulcus must be re-formed. This may be effected by dividing the soft tissues and keeping them apart by means of a flange attached to a splint, or, less usefully, by packing the wound till its surface has become epithelialized. Pickerell uses a Thiersch graft, retained in contact with the raw surface by a plug of dentist's impression compound until it has united.

Closure of the jaws due to muscular contraction must be regarded as a subordinate group. Imbert and Réal⁷ say it is certain that in a proportion of these cases there is pure simulation or gross exaggeration. Their treatment is directed to prevent cicatricial lesions. They use an automatic mouth-opener twice a day for about half an hour, and maintain the opening obtained by inserting a wooden wedge, which is retained in place between whiles. In essence their treatment simulates that used to stretch scar tissue after it has formed.

Curiously, ankylosis of the temporo-mandibular joint seems a very rare sequence of war injuries. Pickerell⁸ describes one case following a wound, due to shrapnel, extending from below the left ear to the left eye. About eighteen months later, when he operated, there was dense osseous union between the zygoma and the neck of the condyle on a plane lateral to the joint, and

PLATE XXIII.

SPLINTING FOR FRACTURED MANDIBLE

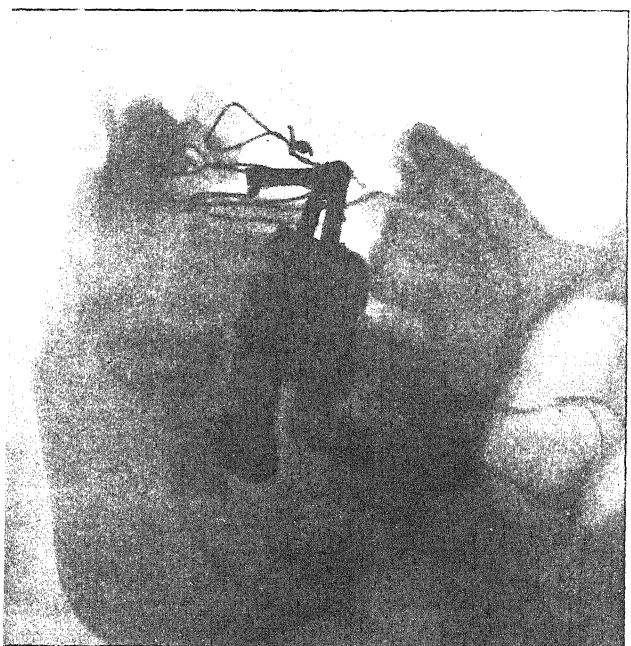


PLATE XXIV.

GUNSHOT WOUNDS OF JAWS



Fig. A.—The open-bite position in the healing of large electrizing wounds of the face. (G. P. Cole).
From "The Lancet."



Fig. B.—Appliance fitted preparatory to plastic operation to re-form chin. (Kazandian and Burrows).
From "The British Journal of Surgery."

the coronoid process was united to the anterior part of the zygoma by dense fibro-cicatricial bands.

Plastic Operations to Re-form the Lips and Cheek.—In these cases it is often difficult to form a flap of mucous membrane to line the cutaneous flap. For this purpose Cole⁹ uses skin flaps which have been previously depilated by radiations. The result of depilation has in his cases been permanent, and the skin, he states, remains soft, supple, and perfectly healthy. The following figures illustrate his method :—

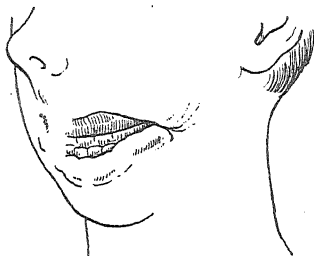


Fig. 63.—Shows loss of tissue at buccal orifice.

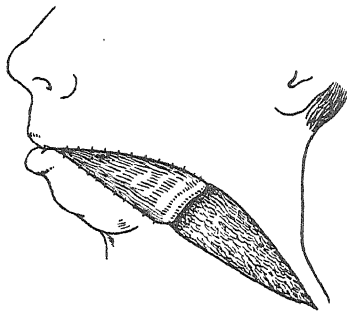


Fig. 64.—Flap turned up from neck with epithelial surface inwards.

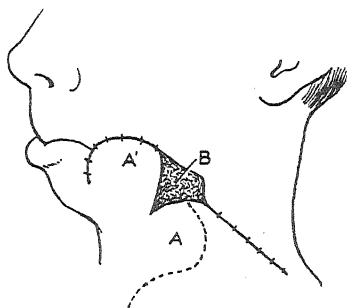


Fig. 65.—Cutaneous flap cut from A and slid up into contact with raw surface of previously-mentioned flap, some portion of which is seen at B.

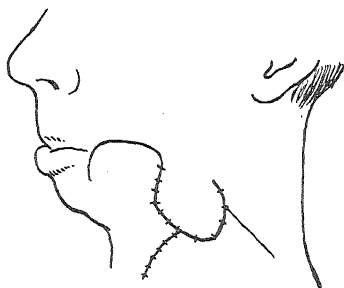


Fig. 66.—The result.

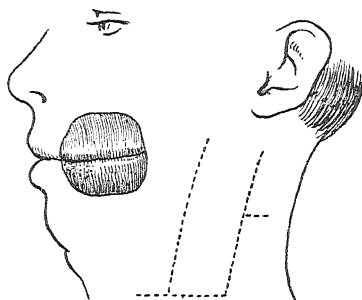


Fig. 67.—Flap cut from margin of a gap and inverted over it.

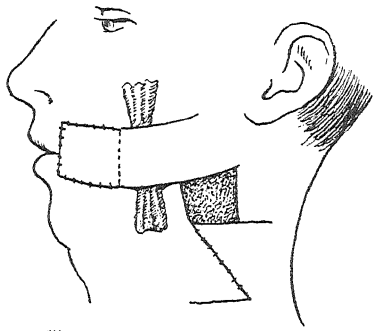
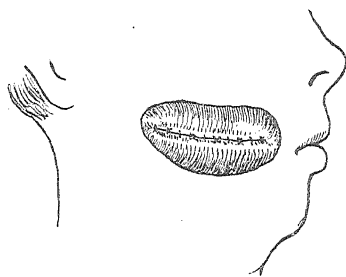


Fig. 68.—Cutaneous flap swung forward into contact with raw surface of previous flap.



Figs. 69, 70.—Wound, skin around which has been depilated; dotted lines mark two flaps to be inverted as in *Fig. 70*.

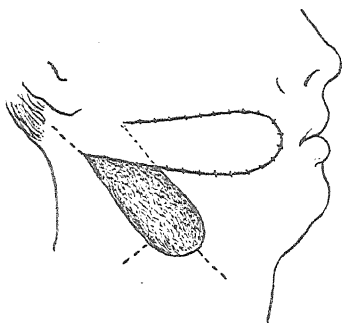


Fig. 71.—The cutaneous flap swung forward into contact with raw surfaces of previous flaps.

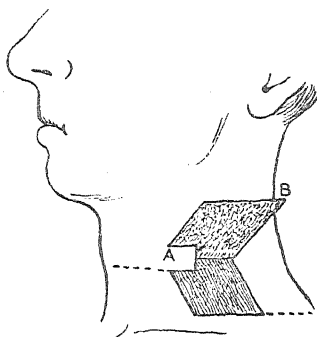


Fig. 72.—Flap detached and turned inwards.

When it is impossible to close a wound by these methods he uses a double epithelialized flap or flaps. The method he prefers is shown in *Figs. 72-74*.

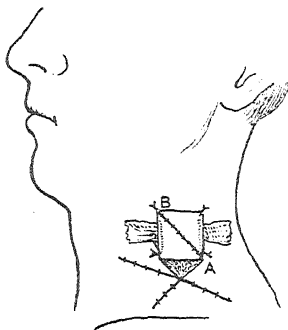


Fig. 73.—Flap folded to bring two raw surfaces in contact, and other incisions to close surface wound.

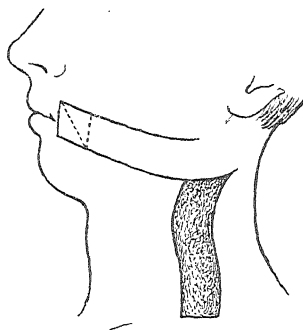


Fig. 74.—Extension of the pedicle.

Figs. 63-74.—PLASTIC OPERATIONS (P. P. COLE) TO RE-FORM LIPS AND CHEEK.

Redrawn from 'The Lancet'.

PLATE XXV.

GUNSHOT WOUNDS OF JAWS
(GILLIES' USE OF DOUBLE FLAP FROM SCALP.)



Fig. A.—The flaps moved into place.

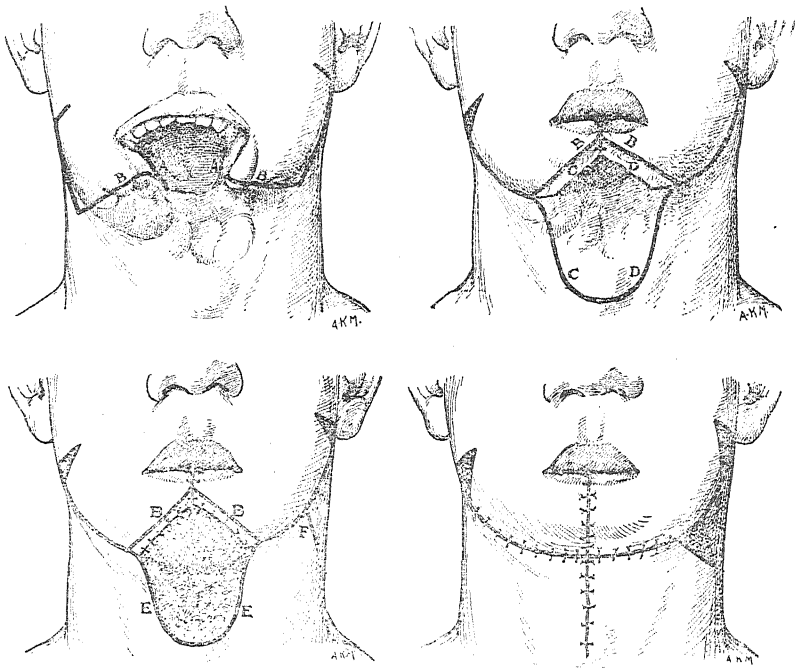


Fig. B.—The pedicles replaced on scalp.

By kind permission of 'The Lancet.'

The extension of the pedicle is made when the surfaces of the folded flap have united, to allow this to be moved to the required position. Its edges are trimmed, and one epithelial surface is united to the mucous membrane, the other to the surface skin. When these are united the pedicle is divided and the redundant portion replaced in the neck.

Gillies¹⁰ has used double bridge flaps taken from the scalp to replace lost skin in the mental region. *Plate XXV A* shows the flaps moved into place, and *B* the pedicles replaced. In this case a large osteo-cartilaginous graft from the seventh rib was also inserted. The operation appears to have re-formed successfully the chin covered by a full beard, and to have given some degree of masticatory power, where previously there was none.



Figs. 75-78.—Kazanjian and Burrows's plastic operation to re-form chin.

(By kind permission of the 'British Journal of Surgery'.)

Kazanjian and Burrows¹¹ invert a skin flap from the submental region to form a buccal lining for the cutaneous flaps used to re-form the chin when this is lost (*Figs. 75-78*). They say: "It seems that after a while spontaneous epilation takes place." These flaps are moulded over a denture used as a shield (*Plate XXIV, B*). They make the suggestion, useful to facilitate removal and replacement, of making this denture in two halves, hinged together. When in place these halves are locked by means of a bar along their lingual aspect (*Fig. 79*).

They claim that the patient is able to do a certain amount of mastication with this apparatus after a plastic operation. The force can be increased

by the patient pressing up the chin with the left thumb during each act of mastication. They say the habit is easily acquired and is not unsightly. Nevertheless, they rightly consider the ideal to be the re-establishment of bony continuity by bone-grafting.

Bone-grafts. *Free Bone-grafts.*—Platt, Campion, and Rodway¹² give details of nine free bone-grafts inserted for patients at the 2nd Western General Hospital, Manchester. Bony union is reported in six of these. In two, the splints, at the time of writing, had not been removed, and in one case apparently bony union had not taken place. The last case is interesting because a graft was successfully used to close a gap on the opposite (right) side of the

same mandible seventeen weeks earlier. On the left side the ascending ramus was extremely atrophied and had feeble vascularity. The injury occurred a year before the first operation. It has been suggested that it is this atrophy which seems always, or at least very frequently, to occur in a functionless ascending ramus. This fact renders it inadvisable to delay too long before attempting the use of a graft. In six cases pieces of rib were used; in two, pieces of tibia; and in one the graft was taken from the inferior border of the scapula. The grafts were not fixed by wires; to this the writers attach importance. They force the end of the graft under a bone flap raised on the end of the fragments of the mandible, and suture the deeper part of the wound in layers.

Percival Cole,¹³ unless he can fix a graft by wedging with the assurance that such fixation will be adequately maintained, follows the teaching of Arbuthnot Lane and Hey Groves, and uses metal plates for fixing free bone-grafts to the mandible. These plates he screws to the graft before separating the graft from the bone from which it is to be removed. At the time of writing he had used free bone-grafts in 10 cases. In 2 cases suppuration occurred and the graft was extruded; this he believes to have been due to insecurity of fixation. In 3 other cases local infection occurred, 1 being due to badly nourished overlying tissues, and in 2 salivary fistulae formed, though apparently bony union followed. The remaining 5 were progressing favourably. It should be noted that, as is usual with others, the failures were in the early cases.

Pont¹⁴ has performed bone-grafting on twenty-two occasions. He regards the result as certain in the symphyseal region; but when the ascending ramus is atrophied the graft does not unite with it, though it unites at the lower end in the region of the angle. In his opinion, if the loss of tissue is from 0 to 3 cms., the graft should be from the mandible and slid into place.

Pedicated Grafts.—Percival Cole¹³ has developed the method of taking a pedicled graft from the lower border of the mandible to bridge a gap in the same bone. His method is as follows: A suitable splint having been applied, the skin incision is curved well into the neck, reaching to a lower level in front than behind. The flap consists of skin only. The posterior fragment is

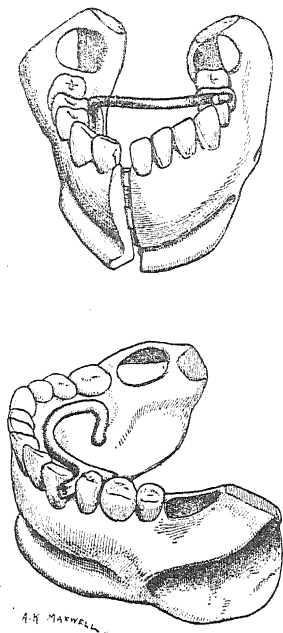


Fig. 79.—Permanent dentures used with Kazanjian and Burrows's plastic operation.

thoroughly exposed, but only the extremity of the anterior fragment. At a level below that of the buccal sulcus the soft parts over the facial surface of the anterior fragment of the mandible are divided horizontally and the bone sawn through (*Fig. 80.*) The periosteum on the oral surface is divided. Lateral incisions through the platysma and deep fascia define the pedicle. This is gently dissected from the underlying structures. As broad a surface as possible is freshened on the posterior fragment, and holes are drilled through both the anterior and the posterior fragments (*Fig. 81.*) Fine silver wire ligatures are passed through these holes, and then around the graft passing through its pedicle (*Fig. 82.*) By tightening these ligatures the graft is brought

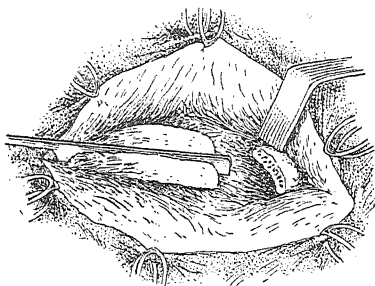


Fig. 80

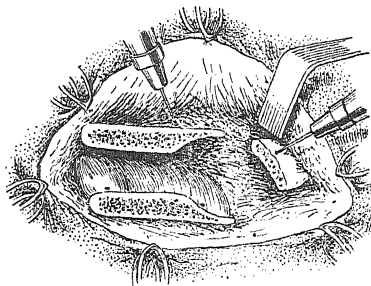


Fig. 81.

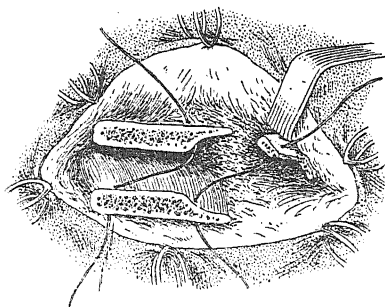


Fig. 82.

Figs. 80-82 ILLUSTRATING PERCIVAL COLE'S PEDICLED MANDIBULAR GRAFTS.

By kind permission of the 'British Journal of Surgery.'

into snug contact with the freshened surfaces of both the anterior and the posterior fragments. Then the surface wounds are closed. A drainage tube is inserted and retained for twenty-four hours. By this operation he has succeeded in obtaining a graft 3.5 cms. long. In the first four cases absorbable ligatures were used. These gave way, so that contact of the graft with the posterior fragment was not maintained. One of these cases is not claimed as a complete success. In the other three the fractured area was re-exposed. At the anterior end there was perfect union; but at the posterior, fibrous tissue separated the graft and the fragment; the ends were freshened and wired together and union obtained. In one of the last four cases a swelling formed, and there was a discharge of blood-stained pus into the mouth; probably some latent source of sepsis was present. Now that he has perfected his technique, Cole regards success as assured. He urges that such an operation should not

only be offered but urged upon the patient. An ununited fracture is a "blot upon the escutcheon of surgery."

Hans Pichler, of Vienna,¹⁵ has treated cases with pedicle bone-grafts by a method similar to Cole's, but he

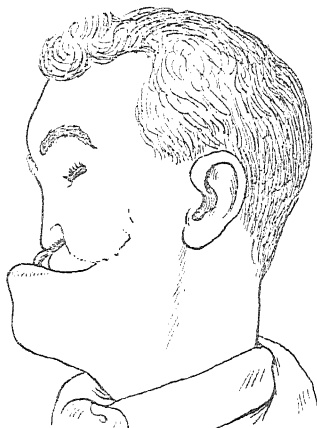
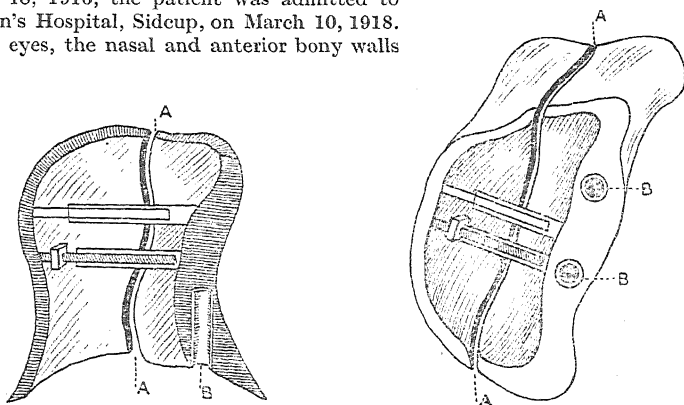


Fig. 83.—Gunshot injuries of maxilla. Before treatment. (Kelsey Fry).

includes the anterior belly of the digastric in the pedicle. Sometimes, to move the graft, it is necessary to divide some of the muscular fibres or to detach the tendon from the hyoid bone. Of 25 cases, 12 completely united, 11 were progressing favourably, 1 case required a further operation, and the result of 1 case does not appear to be reported. He regards his operation as founded on that of Krause,¹⁶ which was a modification of Bardenheuer's.¹⁷ He has tried to move forward a graft taken from the posterior fragment with a pedicle containing fibres of the masseter and internal pterygoid, but does not recommend it.

GUNSHOT INJURIES OF THE MAXILLA.

These injuries are often associated with loss of substance. If the amount be small it is comparatively easily replaced by a mechanical appliance; but when large the overlying soft tissues lose their support, fall in, and produce horrible facial disfigurement. Moreover, if no effort be made early to support these soft tissues, they contract and form adhesions rendering any subsequent replacement very difficult. Such a case is that described by Kelsey Fry.¹⁸ Wounded on Aug. 18, 1916, the patient was admitted to Queen's Hospital, Sidcup, on March 10, 1918. Both eyes, the nasal and anterior bony walls



Figs. 84, 85.—Mould for gunshot injury of maxilla (Kelsey Fry). A A, line of division of mould. B B, sockets for split pins on denture.

of the antra, and all the palate except a narrow strip between the maxillary tuberosities, were lost. The nose and lips had fallen in, the soft tissues being adherent to the remains of the palate (Fig. 83). After admission, the

attachments of the soft parts to the underlying bones were divided, laterally and vertically, as high as the orbits. The soft parts were then stretched forwards and a mould taken of the cavity, etc., from which a model was formed. Whilst the apparatus was being made, the soft parts were retained

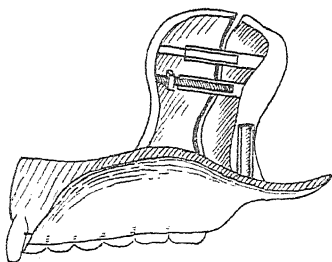


Fig. 86.—Mould with denture in position before expansion.

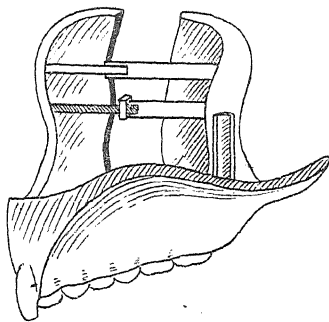


Fig. 87.—New position of mould and denture after expansion.

in their new position by a plug of dentist's impression composition inserted at the time of operation. The apparatus is shown in *Figs. 84-87*. It consisted of a hollow vulcanite box made in two halves connected by two rods sliding into two tubes. On one rod a thread was cut and a nut fitted. In the posterior half two tubes opened on the inferior surface, and into

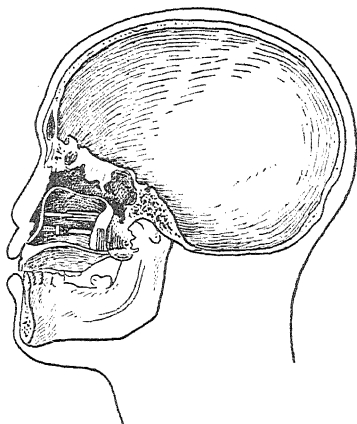


Fig. 88.—The apparatus *in situ*.



Fig. 89.—After treatment.
(Redrawn from the 'Lancet'.)

these two tubes slid two split pins, which passed vertically upwards from a denture, and held the posterior half of the box firmly in place. By turning the nut the front half of the box was moved forward, lifting up the facial surface. This was gradually effected, the best result being attained at the end of three weeks. Then the two halves of the box were united, the gap

between them being filled with vulcanite. Fig. 88 shows the apparatus *in situ*, and Fig. 89 the result of the treatment.

Parrott²⁰ calls attention to the frequency of injuries to the face and head during aeroplane accidents. Many are fatal, and occur in flying schools. He believes they are due to a fault in the design of the safety belts; these pass across the abdomen and prevent the aviator from being thrown out of the machine, but do not prevent the head and shoulders being violently jerked forwards, the head receiving a 'hammer-blow' on the rim of the cockpit, the wind-screen, or the instruments on the switchboard. For irrigation of the mouth he uses normal saline solution. He has seen obstruction of the respiratory passages caused by the 'frothing' when peroxide of hydrogen has been used as a hæmostatic soon after the injury.

SALIVARY FISTULÆ.

Salivary fistulæ are not infrequently associated with gunshot wounds of the face, and occur as a complication during the operation for inserting bone-grafts in the mandible. Morestin¹⁹ has treated 62 such cases since the beginning of 1915; 30 of these were glandular fistulæ and 32 fistulæ of Stenson's duct. In the latter group he now always extirpates the duct, dissecting it out with the surrounding fibrous tissue and then ligaturing it. The gland subsequently degenerates without perceptible effect on the organism.

PENSIONS IN RELATION TO INJURIES OF THE MANDIBLE.

Imbert and Réal,⁷ as a basis for discussion, endeavour to assess injuries of the mandible in relation to pensions. In France a retirement pension presupposes the existence of a condition of incapacity assessed at least at 60 per cent. The scale used is calculated in tens per cent, intermediate figures not being recognized. (1) If the injury includes loss of teeth and fractured alveolus, but sound teeth remain, then, as an apparatus perfectly establishes function, they judge such cases not entitled to an indemnity; but if all teeth are lost, they regard 10 per cent as fair. (2) Fracture of the mandible with union in good position, teeth being present, do not demand indemnity. (3) Fracture with mal-union, one half of the dentition not being in occlusion, they assess at 20 per cent. (4) Fracture with mal-union, no teeth in occlusion, 30 per cent. (5) Ununited fractures, the gap being a finger's width and over, 40 per cent. (6) In ununited fractures, the gap being under a finger's width, they regard the co-efficient of incapacity as indeterminate, and to range from 10 to 40 per cent. In such cases the incapacity is increased, the further the seat of fracture is removed from the temporo-mandibular joint; but it must be assessed with due regard to the efficiency of the retaining apparatus. They regard a retaining apparatus as most effectual when the fracture is in the neighbourhood of the symphysis. (7) Closure of the jaws forms a class apart; it ranges from purely exaggerated muscular spasm to closures due to cicatrices which have relapsed after every effort at amelioration. In all cases they regard it as the duty of the State to provide and, when necessary, keep in repair any apparatus needed. This obligation is happily recognized by the Ministry of Pensions in our own country.

REFERENCES.—¹*Brit. Jour. Surg.* 1918, July, 86; ²*Proc. Roy. Soc. Med. (Odont. Sect.)*, 1917, 6; ³*Ibid.* 1918, 90; ⁴*Ibid.* 57; ⁵*Lancet*, 1918, ii, 315; ⁶*Ibid.* 11; ⁷*Fractures of the Lower Jaw* (University of London Press); ⁸*Proc. Roy. Soc. Med. (Odont. Sect.)*, 1918, 87; ⁹*Lancet*, 1918, ii, 13; ¹⁰*Ibid.* 1917, ii, 850; ¹¹*Brit. Jour. Surg.* 1918, July, 74; ¹²*Lancet*, 1918, i, 461; ¹³*Brit. Jour. Surg.* 1918, July, 57; ¹⁴*L'Odontologie*, 1918 (abstr. *Dent. Record*, 1918, 401); ¹⁵*Archiv. f. klin. Chir.* 1917, June; ¹⁶*Trans. 5th Internat. Dent. Congress*; ¹⁷*Centr. f. Chir.*, 1896; ¹⁸*Lancet*, 1917, ii, 854; ¹⁹*Bull. et Mém. Soc. de Chir. de Paris*, 1917, 845 (abstr. *Surg. Gyn. and Obst.* 1917, 251; ²⁰*Brit. Dent. Jour.* 1919, Jan. 1.

JOINTS, GUNSHOT WOUNDS OF. (*See ORTHOPÆDIC SURGERY.*)**JOINTS, NEUROPATHIC AFFECTIONS OF** (*Arthropathies : Charcot Joints*).*J. Ramsay Hunt, M.D.*

An interesting experimental contribution to the etiology of Charcot joints has been made by Eloesser,¹ of the surgical department of Stanford University. There has been much speculation as to the origin of arthropathies since Charcot directed attention to this subject in 1868. According to Charcot, the tabic arthropathy was due to degeneration of certain trophic nerves, causing atrophy of the bony and articular structures. Barré and Babinski suggested a syphilitic arthritis as the probable etiological factor, which occurs sometimes in the course of tabes, but is not infrequently encountered in the absence of any nerve lesion. Others have held that a combination of bone and nerve lesion was responsible for this serious deformity of the joint. In order to decide this question, Eloesser performed a large series of experiments on cats, cutting the posterior roots leading to one lower extremity, and utilizing the other as a control. In this manner a unilateral lesion of the spinal cord was produced similar to tabes. In certain subjects a deforming arthritis was also induced by traumatizing the joint. As a result of the experiments, the following conclusions were reached :

Bone and joint lesions corresponding to those found in tabes dorsalis may be induced experimentally in the limbs of cats by severing the posterior nerve roots (the sensory fibres) leading from the limb. Severing the posterior roots causes no atrophy of the bone. Tabic fractures and arthropathies have been produced in healthy animals; hence they cannot be ascribed primarily to lues or other infectious causes. The course of a deforming arthritis is not characteristically altered by the addition of an analgesic factor; hence the cause of the Charcot joint is not to be sought in a simple deforming arthritis occurring in a tabetic. Nothing in these experiments gives proof of the existence of trophic nerves. Of three animals whose joints were subjected to operative trauma after having been previously rendered anæsthetic by resection of posterior roots, all rapidly developed Charcot lesions. Trauma in a limb rendered anæsthetic and analgesic experimentally leads to grotesque lesions of the bone and joints, which are in every way the counterparts of tabic fractures and arthropathies; *trauma and lack of the warning sense of pain are the cause of most tabic bone and joint lesions.*

REFERENCE —¹*Ann. Surg.* 1917, Aug., 201.

JOINTS, SURGERY OF. (*See also TUBERCULOSIS, SURGICAL.*)*W. I. de C. Wheeler, F.R.C.S.I.*

Shoulder.—It is a question whether excision of the shoulder-joint or arthrodesis gives the better functional result. With extensive injuries, the result of war wounds, arthrodesis is preferable; in early cases of disease, excision is perhaps more satisfactory. If the arm is fixed in abduction at an angle of about 75° with the body, the swing of the scapula allows the patient to bring his arm well over the head and down parallel to the side when at rest. For the best results the elbow should be carried forward a little in the position of abduction, and external rotation should be sufficient for the hand to be brought to the back of the head.

OPERATION.—The glenoid cavity of the scapula should be freely chiselled until a flat bony surface is presented, and it is often an advantage to freshen the under surface of the acromion process of the scapula, and by fracturing it turn it downwards to increase the bony bed into which the humerus is to be placed. The upper injured end of the humerus is removed, and the compact bone gouged away for about an inch round the shaft, so as to leave ample

vivified bone for ankylosis. The various abduction splints do not hold the limb sufficiently rigid for the first few weeks, and it is better either to incorporate the splint in plaster, or to use plaster alone, extending from the pelvis round the body and arm to the wrist, as a primary dressing.

Thomas¹ describes a new method of excising the head of the humerus. He points out that the objection to the orthodox excision is the division at the attachment to the tuberosities of so many important muscles, and the possibility of a resulting flail shoulder. He states that in old unreduced or recurrent dislocations the removal of the head through the anatomical neck suffices, and this can be accomplished easily after the division of the subscapularis tendon alone.

Henderson² discusses recurrent or habitual dislocations of the shoulder. There is always a history of traumatic dislocation, and the second dislocation may occur a few weeks or months after the first. Those that follow become gradually more frequent. The motion producing luxation is one with the arm

in abduction and a little forward. The position causes the greater part of the humeral head to be pressed against the weak part of the capsule, and at the same time relaxes the biceps tendon, and it runs in the bicipital groove. The weak portion of the capsule is that between the attachment of the triceps and the glenoid fossa below and the subscapularis above. There is no muscular exertion on the anterior portion of the capsule. Resection of the head of the humerus has been performed by some surgeons, as above-

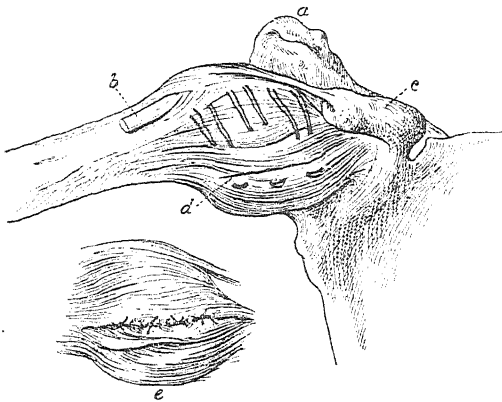


Fig. 90.—Capsule, showing overlapping (capsulorrhaphy), with four doubled chromic catgut sutures in place. *a*, Acromion; *b*, tendon of biceps; *c*, coracoid process; *d*, incision in anterior inferior portion of capsule; *e*, three or four sutures. (Redrawn from the *Journal of the American Medical Association*.)

mentioned, but it should only be done, if ever, in a very modified form.

Arthrodesis in the abducted position gives a useful arm, but it has been found that by merely incising the capsule at the anterior inferior angle and overlapping it, habitual dislocations are prevented. An incision should be made along the anterior fold of the axilla while the arm is in abduction. The pectoralis major muscle is strongly retracted, and the dissection carried down to the capsule below the tendon of the subscapularis. The capsule is incised, and three or four mattress sutures of chromic catgut are inserted. Rotation of the arm assists the overlapping of the capsule when the sutures are tied (Fig 90). Abduction of the arm should not be permitted for six weeks after this operation. Young divides the pectoralis major and the latissimus dorsi muscles at their insertion into the bicipital groove in cases of recurrent dislocation. The arm is held at a right angle to the body from ten days to a fortnight. He bases the operation on the fulcrum action of these muscles.

Brickner³ states that most of the pains in the upper arm so often treated for rheumatism and neuritis are surgical affections. He calls attention to the frequent presence of cervical rib. [In this connection, it must be remembered

that pressure of the last dorsal nerve against the first rib may cause ulnar-nerve neuritis. Stiles has shown that removal of the portion of the first rib bearing the groove for the last dorsal nerve will cure these cases.] *Subdeltoid bursitis* is one of the commonest causes of pain in the arm. The bursa between the acromion process and the greater tuberosity of the humerus may be injured by a fall on the outstretched arm, or other internal violence during such exercises as raising the arm to beat a rug, or hanging from a car strap. Tearing of the supraspinatus tendon, or slight sprain fractures of the greater tuberosities, are often associated with bursitis. The condition nearly always occurs in adults.

The abduction disability should be first corrected. The illustration (Fig. 91) shows a simple method of obtaining abduction in a painful shoulder. The head of the bed is raised, and the wrist attached as shown. Abduction takes place automatically and often painlessly, even in acute cases. Operation must be undertaken in the chronic forms and where automatic abduction fails to restore function and relieve pain and spasm. The diagram (Fig. 92) shows a common position of the deposit of lime salts associated with subdeltoid bursitis.

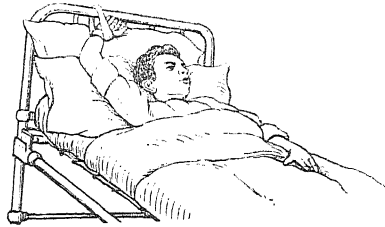


Fig. 91.—Brickner's easily regulatable method of automatically restoring abduction in the treatment of shoulder disability. (Redrawn from the *Journal of the American Medical Association*.)

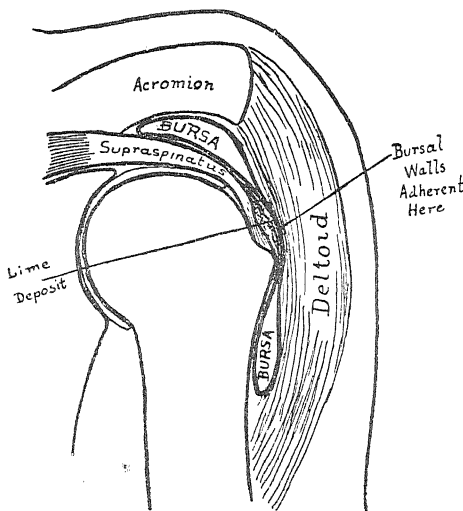


Fig. 92.—Diagram showing why many surgeons think they find the deposit in the bursa. Over the mass the two bursal walls are adherent and, unless separated by the operator, they are incised as one. (Redrawn from the *Journal of the American Medical Association*.)

Day¹ describes subacromial bursitis with or without a tear of the supraspinatus tendon, and with calcareous deposit. There may be injury of the supraspinatus tendon alone, caused probably by pressure of the sharp under edge of the acromion on the tendon, made during a sudden violent motion of the arm. If the patient stands with both arms abducted, and downward pressure be made by the examiner against abduction, a defective supraspinatus tendon can be diagnosed by the wavering of the arm under added weight. It must be remembered that the subacromial bursa embraces what is often spoken

of as the subdeltoid bursa. The bursa is $2\frac{1}{2}$ to 3 inches in diameter, its under surface is firmly attached to the tuberosity of the humerus, and to the expansion of the supraspinatus tendon. Above, it is attached to the under surface of the acromion and coraco-acromial ligament. It is obvious that inflammation

of the bursa is an obstacle to free abduction of the arm. The function of the bursa is to avoid friction at the time when the tuberosity of the humerus passes under the acromion ligament. A useful diagnostic sign in the acute stage is as follows: Ask the patient to bend over and let his arms swing forward, then ask him to straighten up, holding his arms as they are. To his surprise he finds he can fully abduct his affected arm without pain. This is due to the fact that the tuberosity has passed beneath the acromion; the pain reappears when he lowers or abducts his arm. Day advises operation in certain cases. An incision is made from the acromion process over the greater tuberosity of the humerus. The fibres of the deltoid muscle are separated and retracted: this exposes the roof of the bursa; the bursa is opened and the contents are scooped out; the tendon of the supraspinatus is brought into view and repaired if torn. The arm is put up in abduction in plaster-of-Paris, or treated in the manner shown in *Fig. 91*. According to Day, all cases of acromion bursitis are traumatic.

Turner⁵ describes a method of reducing dislocations of the shoulder-joint. The patient is anæsthetized lying on his back on an operating-table or on a convenient couch. The surgeon now rolls up an ordinary washing-towel and loops this round the inner side of the injured arm, just below the axillary folds, so that the free ends pass outwards at right angles to the long axis of the body. The loop can be made equally well from a length of flannel bandage 3 inches wide. As soon as the patient is anæsthetized, an assistant grasps the forearm on the injured side and, without moving the arm from the patient's side, applies extension strongly in a direction parallel to the long axis of the patient's body. At the same time the anæsthetist, whose hands are now free, makes counter-extension by slipping his fingers into both of the patient's axillæ, while the surgeon, grasping the free ends of the loop, pulls steadily in an outward direction. The extension, counter-extension, and external traction should be made simultaneously and steadily, as well as strongly, but without jerking. The head of the humerus enters the glenoid cavity at once with the characteristic click, and the arm is then bandaged to the patient's side.

Cousens⁶ suggests another method. The surgeon requires the assistance of two men. The patient sits with the sound arm over the back of the chair. One assistant sits in a chair on the injured side, both his hands are placed on the axillary border of the scapula (fingers towards the vertebræ), and he is told to press the shoulder-blade towards the spine. The other assistant stands on a chair behind the patient, takes hold of the wrist and forearm, and pulls the arm up, the tips of the fingers of the injured limb pointing towards the ceiling, the elbow extended, the palm of the hand looking forwards, the biceps parallel with the ear of the patient. The surgeon supports the head of the bone by gentle pressure with his thenar eminence. This procedure is continued until the muscles are felt to relax, usually less than five minutes. The arm is gradually lowered, and, if everything has been done slowly—no sudden movement—the humerus will be found in position when the arm is brought to the side.

The author claims for this method the immediate cessation of pain from the moment the manipulation commences. The vertical position corrects the shortening of the muscles and takes away pressure from the nerves of the brachial plexus, the fixation of the scapula renders such extension complete. He has had no difficulty in reducing various kinds of dislocation by this method, but the subspinous variety has not come under his observation.

Thomas⁷ states that *flail shoulder-joint* is the result of dislocation, and is essentially the cause and not the result of traumatic brachial paralysis. This is proved by the fact that early operative treatment of flail shoulder results in the cure of the paralysis. The subject is dealt with exhaustively in a lengthy paper.

Congenital Elevation of the Scapula (Sprengel's Deformity).—Quite often the scapula is found rotated as well as raised, so that the lower angle approaches the spine. There is scoliosis, and sometimes absence of one or more of the scapular muscles, and, as in the case reported below, there is occasionally a bridge of bone connecting the scapula and vertebral column. The scapula may be attached to the vertebral column by bone, fibrous tissue, or cartilage. Binnie⁸ discusses the literature on the subject, and the theories that have been advanced regarding the etiology of the accessory bone.

De Mowbray⁹ records a case, and states that the left shoulder was markedly raised, and the movements of the scapula on the chest-wall were limited in all

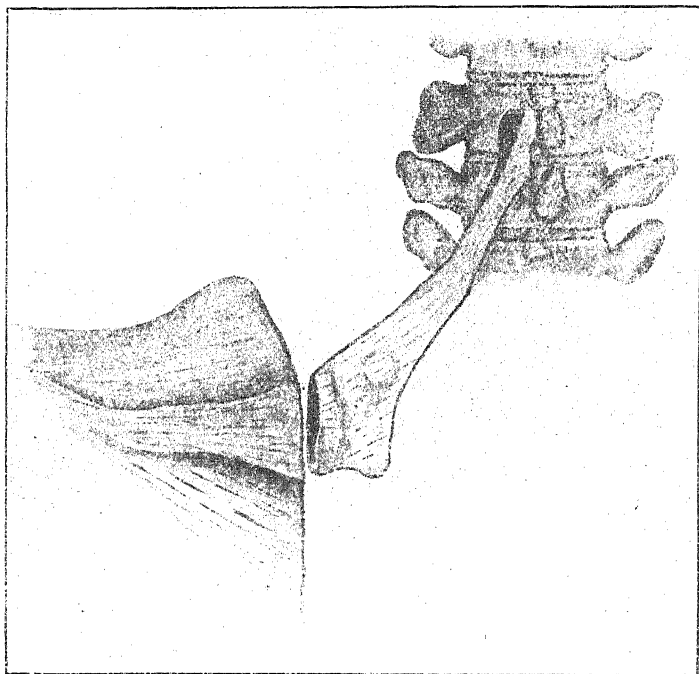


Fig. 93.—Congenital elevation of the scapula. Semi-diagrammatic representation of the abnormal bone and its articulations.

directions. The left arm could not be raised above the head. Palpation revealed the presence of a bony process running from the vertebral border of the scapula, at the level of the spine, upwards and inwards towards the spinous process of the seventh cervical vertebra. At operation the bone was found to be covered by the trapezius muscle, and attached to its deep aspect was a thick muscular belly, apparently a detached portion of the levator anguli scapulæ. On removal, the bone was found to be $4\frac{1}{2}$ in. in length. The only clue to the morphology of this condition lies in a cartilaginous bar which occupies a somewhat similar position in a certain group of fishes (Dipnoi).

Hip.—Pathological conditions about the hip-joint are often difficult to interpret. *Perthes' disease*, or *osteochondritis juvenilis*, requires special mention.

In this condition there is partial or total destruction of the head of the femur, with stumping of the neck. Naturally the condition has been confused with tuberculous hip disease. If a case is treated on the lines of tuberculosis, the head of the femur rebuilds in a surprising manner, and will even regenerate, in much the same way as the bone develops when used after the reduction of congenital dislocation. Children with Perthes' disease are often robust and healthy, in contrast with those suffering from tuberculosis. The age varies from four to ten years; there is a slight limp, and occasional pain; the joint movements are free except in the direction of abduction. Blanchard¹⁰ states that it is a nutritional disease of the muscles, and of the bones of the hip and leg. The femoral head becomes obliterated wholly or in part by weight bearing on the softened bone. Taylor¹¹ refers also to Perthes' disease, and calls attention to the mild symptoms and benign nature of the condition. This writer also states that local bone osteolysis may cause a light spot in the neck or trochanteric region on the Röntgen plate. This may be due to: (1) Hæmorrhagic osteomyelitis, which is a benign process usually running a chronic course, with mild symptoms, notably lameness, and frequently ending in recovery, sometimes with and sometimes without an operation; pus is never present; or (2) A bone abscess with the formation of pus, which may run an insidious course with mild symptoms, or a more acute course with severer symptoms, and if evacuated and drained, usually ends in recovery with good function. Both classes of cases are often diagnosed as hip tuberculosis, and sometimes as sarcoma. An early correct diagnosis enables the surgeon to simplify the treatment and save the adjacent joint by a timely operation when its integrity is threatened.

[In my experience Perthes' disease may be distinguished from tuberculous disease in a child by the free movements of the joint in flexion and extension; other movements are limited. There may be some shortening, but not swelling or tenderness about the hip-joint. The Trendelenburg sign is present as in congenital dislocation of the hip. There is usually a slight limp. As a rule there is no history of trauma, and the patients are usually boys. There is delay in the ossification of the cartilage of the head, and also in isolated areas in the acetabulum, giving rise to 'cartilaginous isles.' In this way cartilage persists where bone is needed to bear weight. The epiphysis becomes flattened, and sometimes breaks into two or three pieces. These characteristics are often well shown by x-ray photographs.—W. I. de C. W.]

Roberts¹² also draws attention to this condition. He believes that it is the result of inherited syphilis, and treats the case accordingly. Roberts' reasons for thinking the cases are specific in origin are as follows: First, the negative Wassermann must be disposed of, and that is not difficult, for it is common experience that subjects with frankly syphilitic bone lesions, when a family history of syphilis exists and when the pathological process disappears under mixed treatment, give a negative Wassermann reaction. Several cases of this kind have been observed during his recent studies. Therefore, it may be contended that a negative Wassermann reaction in Perthes' disease does not exclude syphilis. Secondly, the pathologic findings described by Perthes coincide with one of the most common expressions of bone syphilis in children, namely, osteochondritis. Although the joint lesions of congenital syphilis have been much neglected, every author who has written on syphilis of bones and joints has referred to osteochondritis as it appears in the region of the knee, wrist, and ankle. As a matter of fact, many cases of joint enlargement ascribed to rickets are nothing more nor less than syphilitic osteochondritis. Then again, we find in subjects with Perthes' disease dental evidence of inherited syphilis. This does not mean Hutchinsonian teeth necessarily,

but more frequently the erosions and malformations of the first permanent molars and other units that have been so well described by Cavallaro, or anomalies of spacing of the incisors. These dental signs indicate that spirochætes were undoubtedly present in the body during the period of gestation, and it is a reasonable conclusion that they may have persisted to cause the condition known as Perthes' disease, just as they may persist to cause other forms of bone lesions in children. Finally, the course of osteochondritis of the hip is similar to that of many other syphilitic joint conditions in that the destructive process is self-limited, and that there is a tendency to more or less complete restoration of function. In view of the foregoing facts, it would appear that treatment of Perthes' disease on the hypothesis that it is of syphilitic origin is worthy of further investigation.

Sacro-iliac Disease.—W. H. Palmer¹³ describes flat-foot as a possible cause of synchronous pains in the sacro-iliac joints. He states there has been little written upon the subject. He believes the same factors which produce flat-foot might bring about a pelvic condition with relaxation of the sacro-iliac joints. Static conditions are the most common causes. Traumatic factors (after Pott's fracture, contusion, rupture, or partial rupture of the muscles, or injury to the ligaments and nerves) occur in 5 per cent of all cases; paralytic (after infantile paralysis) in 3 per cent; rickety (when the bones are softened in genu valgum, other signs of rickets co-existing) in 2 per cent; static in 90 per cent. He quotes Magnuson as follows: "Probably more women have been operated upon for pelvic trouble because of flat-foot and flat back, than on account of any other poor diagnosis we have made." Our attention would naturally be directed to the plantar arches when we encounter a history of pain in the feet and legs which appears after walking. He reports two cases where correction of foot troubles relieved the backache.

Simpson¹⁴ describes traumatic luxation of the sacro-iliac joints without fracture of the pelvis. The great violence necessary to produce this lesion expends itself upon the blood-vessels and viscera, especially the bladder. There may be inability to void urine, and the limbs may be partially and permanently paralyzed. There is general severe shock.

Knee.—Churchman¹⁵ concludes that apyogenic or gonococcal infection of the synovial membrane of the knee may be cured simply and promptly by lavage of the joint and staining with gentian-violet. The gentian-violet kills with great ease Gram-positive organisms, and prevents the growth of Gram-negative organisms when used in strong dilutions. The dye is used in weak solutions, 1-1000 being sufficient strength. He states that a joint can be not only washed out, but also distended, with little or no pain. The joint first of all should be irrigated with normal saline solution, and it is often necessary for success to repeat the irrigation, and to use a large trocar and cannula.

Laubie¹⁶ deplores that so many men with hydrarthrosis of the knee are allowed to go for months before the knee is punctured. When the joint effusion is withdrawn promptly, smooth recovery is the rule in thirty or thirty-five days, but he has encountered many cases in which this was neglected or postponed, and the men after eight, eleven, or more months are still incapacitated by their knee lesion. In one of the cases reported, the man had been given treatment at ten different hospitals in the sixteen months, but with little benefit. Laubie then punctured, withdrew 60 grms. of fluid, and rinsed out the cavity with a 1 per cent phenol solution. Puncture alone is not enough, as he shows by some examples. It should be supplemented by lavage of the joint cavity with some antiseptic. Among the seventeen cases described were some with gonorrhœal or rheumatismal hydrarthrosis, but all yielded the same to puncture, with lavage, exercise, and massage. In one case the hydrarthrosis

ureter is useful, but it should be used with caution, as there is a danger of injury to the kidney if the fluid is retained behind an obstruction. This method should only be used when the catheter can be passed beyond the suspected shadow, and therefore beyond any obstruction.

In discussing *x*-ray examination of the urinary tract, E. W. Caldwell⁹ states that the records were complete in 455 cases. Calculi were reported in 119 cases, and no calculi in 314, while in 22 there were doubtful shadows. In most of the doubtful cases further examination was declined. Of the 119 cases of reported calculi, 49 were confirmed either by operation or by subsequent passage of calculi. In the remaining 70 cases there was no definite information that calculi had actually been seen. On the other hand, he was unable to obtain 'reasonable evidence' that there was any error of diagnosis of calculus in any of the 119 cases reputed positive.

Of the 22 doubtful cases, calculi were found by operation in 2, and calculi were subsequently passed in 3 cases. In the remaining 17 there was no information as to calculus.

Of the 314 negative cases, stones were subsequently passed in 5, and in 2 cases stones were removed by operation. This gives 7 proved errors in 290 cases, or 2.4 per cent. (*See also p. 36.*)

Writing from the Mayo clinic, Rochester, on lithiasis with bilateral renal involvement, Braasch¹⁰ finds bilateral lithiasis in 12.3 per cent of cases, and both bilateral and unilateral lithiasis occurred twice as often in male as in female subjects.

Pain in bilateral lithiasis was unilateral in 64 per cent, and absent in 8 per cent of cases. Bilateral stones were found most frequently in the pelvis and calices. The functional tests, *x*-ray examination, and cystoscopy may be insufficient to determine the amount of healthy renal tissue, which can only be ascertained by exploration. Patients may be inoperable because of renal insufficiency, secondary infection, kidney destruction, or constitutional complications. Patients with large bilateral stones causing no symptoms or complications are better without operation. Recurrence took place in 10 per cent of cases of unilateral lithiasis, and in 20 per cent of cases of bilateral lithiasis.

Renal Tuberculosis.—Bourime¹¹ states that "the prognosis in renal tuberculosis up to the present has been unfavourable under the present-day method of treatment." Nephrectomy for tuberculosis in the kidney, he says, is a failure, for it fails to remove the focus of infection outside the kidney, leaving the patient liable to extension of the infection to the remaining kidney from the same focus. He believes that it is 'almost certain' that if tuberculin treatment were instituted early in the disease, the prognosis of renal tuberculosis would be much more favourable. Early diagnosis in renal tuberculosis, the author states, can be made by the tuberculin test alone. This author ignores the possibility of treatment of the primary focus by tuberculin after nephrectomy of the tuberculous kidney. He brings forward no evidence to prove that nephrectomy is a failure.

Lower and Sharpe¹² discuss the results of nephrectomy for renal tuberculosis in 87 cases. There were 2 deaths—1 from shock, and 1 from tuberculosis of the second kidney. Ten patients were known to have died at a later date—2 from tuberculous peritonitis, 4 from pulmonary tuberculosis, and 4 from unknown causes. Definite information was obtained about 45 cases. Of these, 9 per cent reported no improvement in bladder symptoms, 20 per cent were in perfect health, and all the rest were greatly improved. Pain in the back and renal hæmaturia disappeared in all. Pyuria, where due to bladder lesions, persisted. Healing of the wound took place within a month in 29 cases, within

a year in 21, and within two years in 16. Of the total cases, 8.1 per cent were improved and 60 per cent were completely cured. (See also TUBERCULOSIS, RENAL.)

REFERENCES.—¹*Surg. Gyn. and Obst.* 1917, Nov., 561; ²*Ann. Surg.* 1917, Oct., 479; ³*N. Y. Med. Jour.* 1917, Oct. 20, 743; ⁴*Surg. Gyn. and Obst.* 1917, Nov., 403; ⁵*Jour. Amer. Med. Assoc.* 1917, Nov. 3, 1505; ⁶*Ibid.* 1490; ⁷*Ibid.* 1492; ⁸*Ibid.* 1495; ⁹*Ibid.* 1495; ¹⁰*Boston Med. and Surg. Jour.* 1918, Feb. 28, 292; ¹¹*Amer. Jour. Med. Assoc.* 1917, Oct., 469; ¹²*Surg. Gyn. and Obst.* 1917, Nov., 522.

LABOUR.

W. E. Fothergill, M.D.

Fever at the Time of Labour.—J. M. Slemans¹ says that in from 2 to 3 per cent of labours the temperature rises above 101°. There are certain severe cases which begin with rapid pulse and rigor and in which there is decomposition of the amniotic fluid, sometimes accompanied by the production of gas within the uterus. These cases are clearly infective in origin. The cause of the more numerous mild cases is more problematical. There is no rigor, the pulse-rate is only slightly quickened, the patient complains of no symptoms, and the fever does not as a rule continue after labour. The muscular work of labour has been thought to account for slight temporary rises of temperature, but Warnekros made cultures from the mother's blood in 25 cases, and found it to contain organisms in 18 of them. The blood was sterile the next day in 17 of these positive cases. Thus in 70 per cent of the cases there was genuine evidence of temporary infection. To explain the cases in which the maternal blood contained no organisms, stained sections of the placenta were examined, and in every instance of fever during labour, organisms were demonstrable in the placenta, even though the maternal blood contained none. The mild and temporary nature of the infection is explained by the view that the focus of infection is limited to the structures expelled, namely, the placenta and membranes. Slemans has examined 34 cases of this placental bacteræmia, and finds the infection to affect the amniotic surface of the placenta. It is more serious for the child than for the mother, and frequently kills the fœtus shortly before or after birth. Organisms can reach the placenta by three routes: by the maternal circulation, from the peritoneal cavity by the Fallopian tubes, and from the vagina by the cervical canal. The last is the usual route. The writer noted 34 cases in 1600 labours, and he therefore estimates the frequency of interpartum fever due to placental infection at 2 per cent of labours at term. Blood cultures at the time of labour and the degree of fever at that time have no prognostic value; but the puerperal morbidity was high—63 per cent in these cases; and the mortality was also high—6.2 per cent. The infant mortality was 40 per cent. (The series includes, however, cases of toxæmia, placenta prævia, etc., in short, all the 'accidents of labour' as well as infections.)

REFERENCE.—¹*Amer. Jour. Obst.* 1918, Sept., 321.

LABYRINTH, AFFECTIONS OF. (See also AVIATION, THE EAR IN; VERTIGO.)

John S. Fraser, M.B., F.R.C.S.

Suppurative Labyrinthitis.—Duel¹ holds that in an acute labyrinthitis there are just two tests that the otologist need depend upon without subjecting the patient to unnecessary inconvenience: (1) Complete loss of hearing (Bárány apparatus); and (2) Vestibular nystagmus (caloric reaction). These are the only necessary functional tests, because the other tests will not shed any additional light and may subject the patient to grave danger. If a patient suffering with acute labyrinthitis has manifested symptoms showing that both the hearing and static senses are ablated, one may as well take it for granted that, on Romberg's test, he will fall toward the side of the lesion;

that if whirled, he will probably show certain well-known reactions; that if moved about, he will exhibit nausea and vomiting. To say that a patient should "avoid undue excitement and any action which might jar the delicate barriers which nature is attempting to erect to prevent extension to the meninges," and to take such a patient out of bed to demonstrate that he will fall in a certain direction on attempting to stand or walk, is very bad practice. All these questions have been settled; we know the reactions we shall obtain, and it is unnecessary to carry them out on an acutely ill patient.

In any case of acute labyrinthitis we are brought face to face with the question of whether or not we shall operate upon a patient who is in imminent danger of an intracranial involvement. Dr. Duel is strongly of opinion that any acute labyrinthitis showing no symptoms outside of the labyrinth stands a better chance of recovery unoperated until the acute symptoms have subsided. This may mean a few days, a few months, or for all time. The symptoms necessary to hold us in this waiting position are: (1) Loss of hearing; and (2) Vestibular nystagmus.

What symptoms should lead one to operate? A temperature of over 100°, accompanied by headache, photophobia, exaggerated reflexes, a positive Kernig, especially if the suspicion of meningeal involvement is verified by lumbar puncture. In the absence of evidence in the cerebrospinal fluid of a beginning meningitis, Duel is of the opinion—for the present at least—that it would be advisable to leave the labyrinth alone, except in rare instances.

Inasmuch as no acute case is operated on unless early symptoms of meningeal involvement are present, any operation is inadequate which falls short of draining the subarachnoid space at the same time that the labyrinth is opened. Any chronic case exhibiting evidence of meningeal involvement should have a similar operation. In the acute case the vestibule should be opened both in front and behind the facial nerve, the cochlea uncapped, and the sealæ and modiolus entirely removed so that the meningeal fluid washes freely through. In the chronic case the cochlea should be uncapped with extreme care to avoid breaking down the modiolus to a point which will open a communication with the meninges. It is not advisable to curette granulations, for fear of opening up an avenue of infection either through the aqueductus cochleæ or the aqueductus vestibuli.

Labyrinth Fistula—a New Symptom.—S. H. Mygind² records a new symptom in cases of labyrinth fistula. It is well known that patients who have a fistula through the bony wall of the lateral semicircular canal suffer from giddiness and nystagmus when the external meatus is forcibly closed by exerting pressure on the tragus with the tip of the finger. A more definite result is often obtained by using a valveless Politzer bag fitted with an olivary nozzle. On raising the pressure in the external meatus by either of the means mentioned above, we produce a nystagmus to the diseased side, i.e., in which the slow or vestibular component is directed towards the sound side. Release of the pressure with the finger, or aspiration by means of the Politzer bag, produces nystagmus to the sound side. Occasionally a reversed fistula symptom is met with.

Mygind noticed that in one case, when the patient was looking straight forward through biconvex spectacles, there was a soft, regular, rhythmic movement of the eyes from side to side. These movements were equal, horizontal-rotatory, and very small. On putting his finger on the patient's pulse Mygind discovered that it was beating in time with the movements of the eyes, each stroke of the pulse being accompanied by one movement to the left and one to the right. He thought the nystagmus was probably due to pulsation in the hyperæmic granulation tissue in the diseased labyrinth, the walls of which

could yield to the endolymph so that it might flow to and fro through the ampulla. In this way each single movement was to be considered as a slow vestibular phase of the nystagmus. Mygind confirmed his theory by compressing the carotid on the diseased side in order to block the flow of blood to the affected labyrinth. Immediately the patient's eyes exhibited pronounced nystagmus to the healthy side. Somewhat later, while the finger was still compressing the carotid, the nystagmus stopped and then turned towards the diseased side. During the nystagmus the patient felt giddy. Repeated experiments constantly gave the same results. At operation a fistula was found in the lateral canal, filled up with granulations.

Mygind records a second case in which the ordinary fistula symptom was absent on account of filling up of the antrum by cholesteatoma. Carotid pressure on the affected side caused a slow movement of the eyes to this side, followed by a strong rotatory nystagmus towards the other side, accompanied by giddiness. On releasing the pressure, the eyes moved slowly to the healthy side, followed by a quick rotatory nystagmus to the diseased side. Pressure on the other carotid had no effect.

Hennebert has shown that in patients suffering from syphilitic deafness, compression and aspiration of the air in the external meatus can sometimes produce the ordinary fistula symptom, although presumably no fistula is present. In some of these cases Bárány has been able to produce nystagmus by pressure on the side of the neck. Mygind believes that in these syphilitic cases we have to deal with an abnormal vascularization of the labyrinth, and possibly also with an unduly moveable stapes.

Mygind holds that the directions of the nystagmus produced by his carotid-pressure method provide a more reliable basis for the differential diagnosis between fistula in the lateral canal and fistula of the vestibule. In the former the slow phase of the nystagmus is to the sound side, and the quick component to the diseased side during the pressure. Release of the pressure produces the opposite movement. In fistula of the vestibule, on the other hand, compression of the carotid produces a slow phase to the diseased side, followed by the quick component to the sound side. On removing the pressure the opposite movements are obtained.

In conclusion, Mygind believes that carotid pressure is safer than compression applied to the external meatus. In slight cases it is sufficient to notice whether the patient becomes giddy or not.

REFERENCES.—¹*Boston Med. and Surg. Jour.* 1917, Mar. 8; ²*Jour. of Laryngol.* 1918, May, 143.

LARYNX, CANCER OF.

P. Watson-Williams, M.D.

Irwin Moore¹ has made a valuable contribution in his review of the literature of intrinsic cancer of the larynx and the operation of **Laryngofissure**, and has added to current knowledge of the subject on various points, especially his description of his newly-designed instruments for improving the technique of the operation. From a summary of the results of thyro-fissure, Moore concludes that, although later statistics show the enormous progress in the hands of the skilled and experienced specialist over the results of twenty-five years ago, due partly to earlier diagnosis and partly to improved technique, yet "there still remains room for a better instrumentation." Certain details in the technique have an important bearing on the immediate and after-results of laryngofissure, and these Moore considers under various headings. The preparation of the patient consists in the removal of decayed teeth, and the use of antiseptic mouth-washes for forty-eight hours before operating, all tobacco and alcohol being interdicted for at least a week beforehand. The

usual precaution of purgation prior to anæsthesia is of course important, and preliminary hypodermic injection of narcotics encourages quiet induction of anæsthesia and lessens surgical shock ; since morphine and cocaine are antidotes to each other, morphine gr. $\frac{1}{6}$ with atropine sulphate gr. $\frac{1}{100}$ are advocated. Cocaine solution 5 per cent, freshly prepared, is injected in the region for the incisions, or else novocain 2 per cent, with a little adrenalin, or eudrenine. Irwin Moore generally uses a needle 3 in. in length, which is inserted through the skin at the suprasternal notch, the site of puncture having been anæsthetized by a drop of pure carbolic acid. The needle is pushed upwards intradermically along the middle line as far as the upper border of the thyroid cartilage, and the solution squeezed out as the needle is withdrawn. A 2-in needle is used when the patient cannot well extend the neck. As for the general anæsthetic, Moore agrees with Bellamy Gardner that chloroform is the only suitable anæsthetic for these cases, and considers that ether causes too much tracheal and bronchial secretion. He emphasizes the necessity of giving the anæsthetic in the upright position in orthopnœic patients, until the trachea is opened, and urges great care in lowering these patients and in extending the neck backwards, as this tends to tighten the vocal cords and so cause complete obstruction before tracheotomy. He says that, although the operation can be done quite well under infiltration local anæsthesia, the mental strain is a severe ordeal to the patient, and is to be avoided. The position on the table recommended by Moore is one in which the patient is placed on the back, while the shoulders are elevated by a firm cushion. A second cushion or sand-bag is then placed under the now fully-extended neck in order to raise it and cause the structures on its anterior aspect to become stretched and prominent (*Plate XXVII, C*).

Standing on the right side of the patient, Moore makes a free incision exactly in the middle line, from the lower border of the hyoid bone to the sternal notch, using a large-bellied knife which, unlike the ordinary sharp-pointed bistoury, has the effect of making the two ends of the incision bevelled. The deeper tissues being divided or separated, the deep fascia is exposed. A transverse incision across the fascia at the level of the cricothyroid membrane enables one to separate the thyroid gland from the trachea ; the tracheotomy tube is then inserted, and demands consideration of the position of the tracheotomy, whether median or low. Moore considers median tracheotomy through the third and fourth rings has advantages over lower tracheotomy, though in short-necked patients the latter is required sometimes, notwithstanding the disadvantage presented by the greater depth of the trachea. Moore's thyroid-gland clamps greatly facilitate the division of the isthmus, ligatures being applied on each side after division.

"One of the most important points, if not the most important point, in the technique of this operation is the free use of cocaine as a local anæsthetic and hæmostatic agent." He uses 10 min. of a 2 per cent solution of cocaine in the trachea to abolish the very marked spasm which occurs on opening the trachea, and to avoid the coughing of mucus over the vicinity. If a short interval is allowed to elapse after injection, a tracheotomy tube may be inserted without any reaction whatever. A second injection should be given, after the interval, through the cricothyroid membrane into the interior of the larynx before it is opened, to allay the reflex irritability, as suggested by Crosby Greene. After inserting the tracheotomy tube, Moore divides the thyroid cartilage from below upwards exactly in the median line, *after* an incision has been made through its covering perichondrium, using his specially-designed shears (*Plate XXVI, A, B*). The instrument is removed by releasing the pressure of the fingers on the lower handle, which causes the upper blade to spring back

PLATE XVI.

LARYNGO-FISSURE IN CANCER OF LARYNX

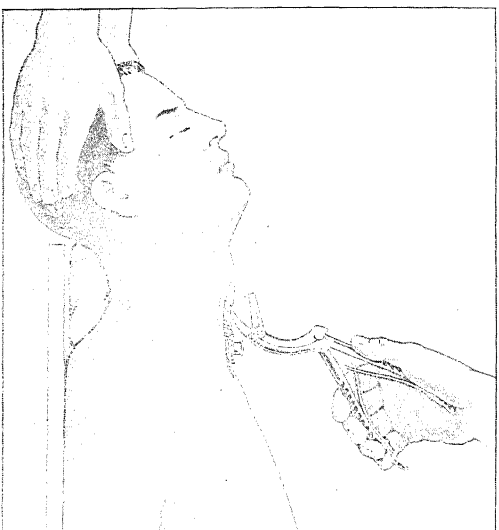


Fig. A. - Forward way of introducing the cutting shears.

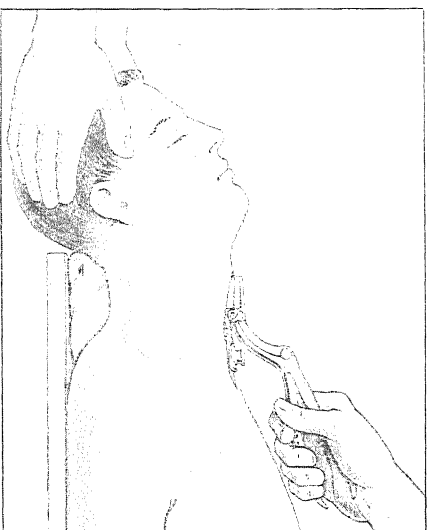


Fig. B. - Position of shears in cutting through the thyroid cartilage.

PLATE XVII.

LARYNGO-FISSURE IN CANCER OF LARYNX—continued

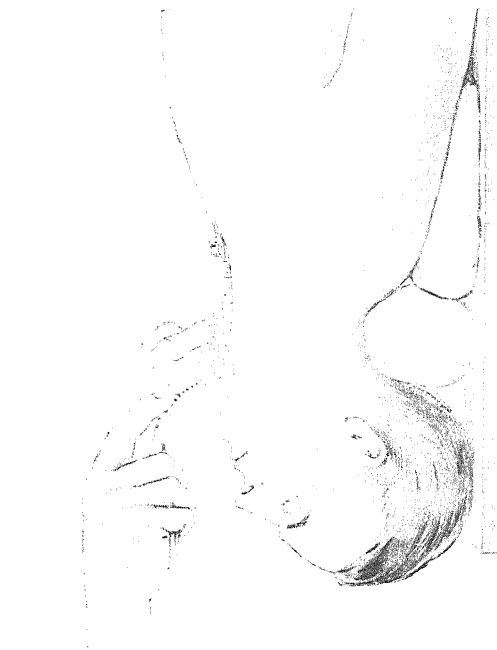


Fig. C.—Showing the best position for the thyro-fissure operation; also when a low tracheotomy has to be performed. The thumb and first finger of both hands are steadying the larynx, whilst also acting as support for the saw to prevent it slipping off the cartilage.

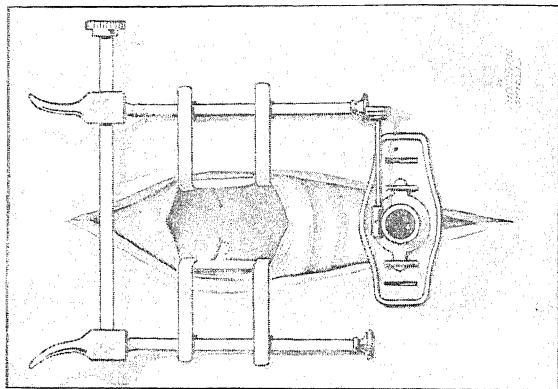
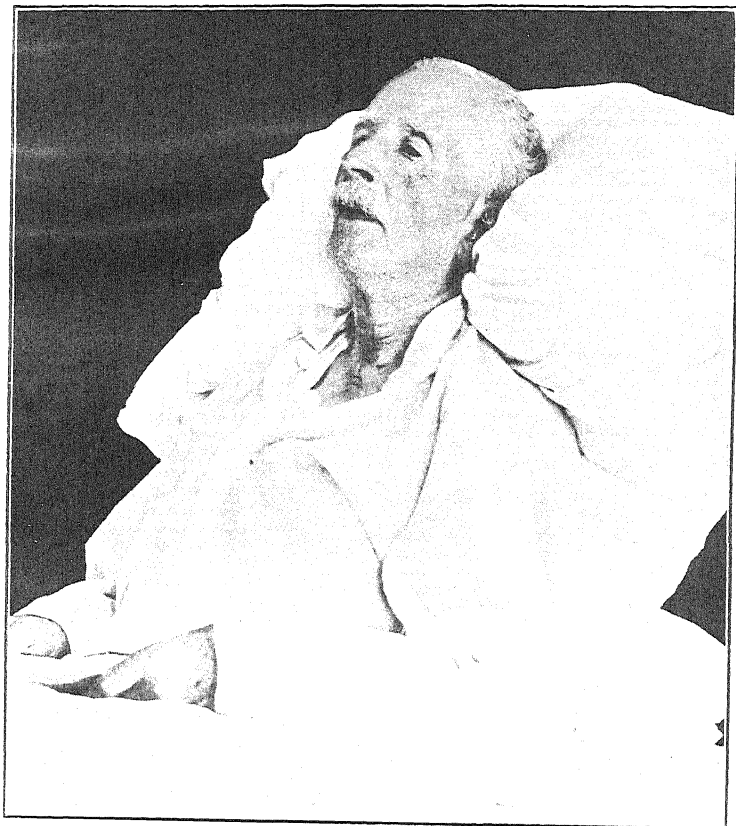


Fig. D.—The self-retaining retractor *in situ* showing the ample room for the manipulation of instruments.

Dr. Irwin Moore

PLATE XXVIII.

LARYNGO-FISSURE IN CANCER OF LARYNX—*continued*



Showing the after-operation position recommended.

Dr. Irwin Moore

and leaves the lower blade to be withdrawn in the opposite direction to its introduction.

The small, fine saw of Irwin Moore has a shaft bent in such a way that when the saw is used the patient's chin does not get in the way of the operator standing above the head of the patient (*Plate XXVII, C*). Great importance is attached to efficient swabbing of the interior of the larynx after splitting the cartilage, and the exposure of the operative area of the interior is greatly improved by his self-retaining adjustable retractor (*Plate XXVII, D*).

For the removal of the growth a perichondrial retractor is first inserted under the perichondrium at the cut edge of the thyroid cartilage, and the soft parts, together with the perichondrium, are raised off the inner surface of the thyroid cartilage. Having completed this separation, the growth, including at least a quarter of an inch of surrounding healthy tissue, is clipped round with scissors, first below, then above, and then round at the back, including the vocal process, or if necessary a large part of the arytenoid may be removed. The first incision should always be made below the growth, in order that if much bleeding occurs it will not obscure the second semicircular cut.

The advantage of this method is that the growth can be removed *en masse* in one piece untouched by any instrument

With regard to the debated question as to the immediate removal of the tracheotomy tube after operation, or its retention for fourteen to twenty-four hours, the opinion of Irwin Moore is that the tube may be permanently withdrawn in the majority of cases after operation, without much risk and with many advantages; whilst in a few cases, especially where a high blood-pressure is known to exist, when considerable oozing has occurred during

removal of the growth and is likely to recur, or where the patient is out of immediate reach of the operator, it is safer to retain the tube. Irwin Moore favours a sitting-up posture for the patient as soon as possible (*Plate XXVIII*), rather than lying on the back or side, as this assists coughing and expectoration.

Mackenty² advocates **Hemi-laryngectomy**, by a method devised and practised by him, for cases too advanced for thyrochondrotomy, and yet not so extensive as to require total removal. He makes two separate incisions, one above for the laryngectomy, and another for a low tracheotomy, with a liberal bridge of tissue between the two incisions. For the hemi-laryngectomy, the skin, cervical fascia, and pretracheal muscles are carefully dissected away from the cartilage, taking care to keep them all in one flap and to keep the inner surface as far as possible uninjured, as it has to form the surface of the new laryngeal wall. The thyrohyoid membrane is then slit laterally, and the trachea divided in half its circumference below the cricoid ring on the diseased side. The pharynx being shut off by packing with iodoform gauze, the loosened half of the larynx is retracted from the centre line and the diseased half removed in the usual way, except that if the mucous membrane over the posterior commissure and arytenoid is healthy, it is saved and lifted away from the cartilage beneath, or it is subsequently attached by fine catgut sutures and used to line the raw surface as far as possible after the cartilage has been detached. The tracheal packing is then removed, and the trachea cleared of blood down to the cannula and packed around with vaselined gauze impreg-

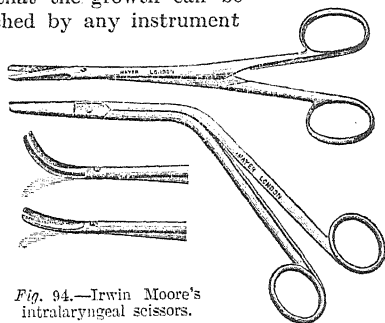


Fig. 94.—Irwin Moore's intralaryngeal scissors.

nated with bismuth. Closure is obtained by uniting the mesial edge of the pretracheal muscles to the mucous membrane of the healthy side of the larynx with fine iodized gut, and the skin edges with silkworm gut. The wound is left open at its lower angle. A sheet of rubber tissue covered on both sides with gauze is glued by its edge to the neck with collodion, across the bridge of skin separating the two wounds, to act as a barrier between the laryngeal wound and the tracheal cannula. If tracheal and bronchial secretion is much increased, Mackenty uses a negative-pressure pump, avoiding strong suction. The dressings should be changed every few hours, and the laryngeal drain is not removed till after two to four days.

Mackenty's technique in operation for **Total Laryngectomy** is essentially that usually adopted, with his own modifications, but he prefers to do the preliminary part of the operation, even to skeletonizing the tracheal stump, under local anæsthesia, and begins the general anæsthesia before attempting the removal of the larynx. When, owing to the extent of the disease, a block dissection of the neck is indicated, he makes three incisions: the first from the chin to the sternal notch, including all the tissues down to the deep fascia; from the upper end, extending laterally on one or both sides a second incision is carried outward across the sternomastoid just under the mastoid process; the third incision begins at the lower end of the first, and is carried outward and downward, crossing the clavicle near its outer third. The object aimed at is to make the flap as wide at its base and as thick as possible, as Mackenty's experience with the rectangular flap generally used has been that the inner edge is prone to slough from lack of nutriment. He removes the sternomastoid entirely, thus gaining an immediate and good exposure of the deep structures of the neck, and after detaching it below he removes it with all the underlying gland- and lymphatic-bearing tissues *en masse*. When a block dissection is not indicated, he makes, in addition to the above-mentioned first incision, two lateral incisions at the upper end of about one inch each, except for patients with long thin necks. The trachea is cut just below the cricoid cartilage, and a rubber tube, 10 in. long, inserted in the trachea. The larynx is separated upwards as far as is compatible with the extent of the growth. If the cancer extends backwards into the œsophageal mouth, that portion of the latter lying in juxtaposition to the larynx is removed. The larynx is then dropped back into position, and the thyrohyoid membrane, etc., divided so as to remove the separated larynx. The subsequent feeding with the inserted œsophageal tube, and the care of the tracheal secretions, are the same as in hemi-laryngectomy. Various valuable suggestions for the after-treatment are given, and Mackenty considers that this is of very great importance.

Beck lays great stress on liberal feeding after the operation by means of the œsophageal tube, which may even be retained for weeks without injury. If by accident it should come out and cannot be replaced, Beck says he would not hesitate to do a gastrotomy, so important does he consider liberal feeding. Rectal feeding, he feels, should not be relied upon—"it is merely an effective way of pretending to do something."

Transillumination of the Larynx and Upper Trachea.—Spencer³ states that if, in an absolutely dark room, the transilluminator is applied either at the pomum Adami or near the cricoid cartilage, and the heated laryngeal mirror is introduced into the pharynx, a good view of the larynx is obtained. As an alternative, the Beck light, on a stand, may be used to light the larynx while the patient is suspended. The normal larynx shows shadows cast by the thicker portions, such as the true and false cords and the cricoid cartilage. The thyroid cartilage offers, of course, the greatest obstruction to the rays of light. The rings of the trachea cast very definite shadows. The ventricle of the larynx

and the cricothyroid membrane admit more light than the thicker structures; hence, at any of these points, inflammatory thickenings, benign or malignant growths, will show most distinctly on account of the shadows which they cast. Schech makes the following interesting statement: "The transillumination of the larynx, first practised by Czermak, and later perfected by Voltolini, has no diagnostic value."

Radium in Diseases of the Upper Air Passages.—Delavan¹ presents a summary of 184 cases of cancer of the upper air passages out of a total of 422 cases treated at the Memorial Hospital in New York City. The best results were obtained by the prompt treatment of early cases—a state of affairs which applies also to the surgery of cancer. In discussing Delavan's paper, Richardson stated that he had unfavourable results after using Radium in four cases of cancer of the tonsil and in one of cancer of the cheek. All died in the usual course, but the radium gave wonderful relief from all disagreeable symptoms. There was very little odour, and the patients were fairly free from pain. Lynch reported four cases, one of which had had no recurrence for eighteen months. This patient received no benefit until the radium was put into the laryngeal cavity through a tracheotomy tube. He had previously had a recurrence of the growth after operation by suspension laryngoscopy. A second case after a third recurrence was thought to be inoperable, but applications of radium caused complete subsidence, and after six months there was no indication of further recurrence. Shurly had operated three times on one case which involved the soft palate, the upper jaw, and the antrum, and after each operation there was a very slow recurrence. For the past three years radium has been used at intervals of from three to six months. Harmon Smith believes that the good results that are obtained from radium are due to the fact that all tumour growths vary in their virulence. Cases benefited by radium are the less virulent ones. Smith has sent a number of inoperable cases for radium treatment after a preliminary tracheotomy. All of these went progressively on to death. Coffin and Pierce have had discouraging results from radium treatment, and Beck has had similar experience in the case of deep-seated growths. Delavan, in closing the discussion, stated that of the 184 cases treated by radium, 22 are believed to have fairly retrogressed; 79 cases have improved. Delavan holds that we do not get the true statistics of the surgery of laryngeal cancer, and that, if we did get them, we should have a pretty ghastly record.

REFERENCES.—¹*Jour. of Laryngol. Rhinol. and Otol.* 1918, May–Sept.; ²*Canad. Pract.* 1917, Oct., and *Jour. Amer. Med. Assoc.* 1918, ii, 863; ³*Ann. Otol. Rhinol. and Laryngol.* 1917, June, 530; ⁴*Laryngoscope.* 1917, Oct., 776.

LARYNX, TUBERCULOSIS OF. (See TUBERCULOSIS, LARYNGEAL.)

LARYNX, WAR INJURIES OF.

P. Watson-Williams, M.D.

A collective investigation of 245 patients suffering from warfare injuries of the larynx was made by Harmer.¹

Laryngeal Injuries.—To estimate exactly the damage sustained by the framework of the larynx is often a very difficult matter, and apparently slight injury may afterwards prove to be serious. A methodical examination is necessary, including inspections, palpation, *x* rays, and, in some cases, direct laryngoscopy.

The epiglottis (8 cases) may be shot away, partially removed, detached from its origin, or simply perforated. The hyoid bone (4 cases) may also be fractured. The thyroid cartilage (10 cases) is often involved. In most cases that reach this country the missile has perforated the cartilage without causing serious injury, its course having been roughly transverse, and generally through

the anterior parts of the larynx. Wounds through the posterior regions involving the arytenoids and pharynx are far more serious. With shell fragments penetrating wounds are also frequent, and the foreign body may cause an abscess and be coughed up later. Definite fractures of the cartilage were observed in 10 cases, simple and comminuted forms being equally common. Post-mortem specimens show every variety of fractures, including those in which the cartilages are broken into many fragments. Instances have been seen in France where the entire larynx has been shot away, but more often the anterior angle of the thyroid cartilage is removed.

The cricoid may also be fractured or perforated, serious complications supervening. One or other arytenoid is often involved, and fixation of the crico-arytenoid joint may result. Considerable confusion obviously exists between fixation of this joint and cord-paralysis, and in some instances it may be difficult to decide which is present. In most cases of paralysis the arytenoid is drawn forward on the affected side, a condition which has not been seen with simple fixation.

In all wounds of the cartilages, perichondritis supervenes to some extent, and healing is thereby delayed. In the more favourable cases the inflammation rapidly subsides, and the patient may be fit for duty in ten to fourteen days. Severe perichondritis is much to be feared, and causes results which recover but slowly.

Wounds of Soft Parts.—The vocal cords are frequently injured, especially in their anterior parts, where scarring generally leads to the formation of a web. Slight damage is quickly repaired, but extensive wounds result in a condition similar to that seen after removal of cancer by thyrotomy.

The ventricular bands, if wounded, may become so swollen that the lumen of the larynx between them is reduced to a slit, this form of stenosis being frequently persistent.

Wounds of Nerves.—Paralysis of the vocal cords after gunshot wounds of the neck is very frequent. Appearing immediately after the wound, it is generally abductor in type in the early stages. Left abductor paralysis was noted in 22 cases, the right cord being affected in 14, and both cords in 2, giving a total of 38 out of 108 cases. The paralysis may disappear after a time, and in others be followed by total paralysis.

Paralysis might be caused by division of the recurrent laryngeal nerve by its involvement in scar tissue, by shock, by toxæmia, or might be idiopathic. It is important to determine which of the above is responsible. So far no instance of divided nerve has been reported. There can be little doubt that shock is chiefly answerable.

Stenosis.—Inflammatory stenosis (44 cases) is common in early cases, and may be due to general inflammation of the mucosa, to œdema, to abscess, or to hæmatoma.

It often happens that the ventricular bands are so swollen that they meet in the middle line and occlude the vocal cords, especially when perichondritis is also present or when crico-tracheotomy has been performed. A common form is webbing of the anterior commissure (10 cases), which is not so serious as the annular and tubular varieties (11 cases). In the latter the scar tissue may involve a considerable length of the air-passage, including the subglottic space. The scar is remarkably tough, and cuts more like gristle than fibrous tissue. In many instances the lumen of the larynx is almost obliterated. Subglottic stenosis (9 cases) is equally difficult to overcome. Tracheal (2 cases) and paralytic strictures (3 cases) are rarer.

Dilated Glottis.—Brown Kelly reports an interesting case resulting in dilated glottis. A slight degree of bowing of the vocal cords is common.

Injuries to Other Parts.—Many laryngeal injuries are complicated by simple perforating wounds of the *pharynx*, resulting in temporary fistulæ (6 cases). Severe wounds are rarely seen in England, but they constitute a serious complication and often produce a fatal result. The cervical portion of the *œsophagus* is often perforated, and in some cases temporary fistulæ result (10 cases). In most instances dysphagia is of short duration, and the absence of complications is remarkable. Cellulitis of the neck, peri-œsophageal abscess, and cervical sinuses may supervene, but are rarely fatal. Temporary dilatation of the gullet has been necessary in several cases, but only one instance of a permanent stenosis has been discovered. Foreign bodies may traverse the *trachea* without causing serious damage, though in most instances a tracheal fistula remains for a time. Severe wounds are likely to be fatal unless early treatment can be afforded. Definite injury to the *carotid arteries* is reported in three cases, and to the internal jugular vein only twice. A transverse section of the neck shows that the large vessels lie entirely behind the larynx, and are so deeply situated that they generally escape in these wounds.

TREATMENT.—The treatment of wounds of the larynx is difficult, and great ingenuity is needed. If centres were provided for dealing with these patients they would enable the surgeons to improve their technique. In the early stages the first essential is to prevent the patient from choking. In every doubtful case tracheotomy should be performed. Nearly one-third of all the cases reported required a tube at some period (tracheotomy, 28 cases; laryngotomy 4 cases). Crico-tracheotomy is an easy operation, but inadvisable because the larynx is narrower than the trachea. The tube is not well tolerated; swelling of the mucosa results; pressure ulcers, necrosis of the cricoid, and granulations supervene; 'retained tube' is more common than with other operations. 'High' tracheotomy through the upper two or three rings is less dangerous than a 'low' operation.

Stenosis.—Tracheotomy may be necessary in any form of stenosis. It is important to recognize that inflammatory stenosis may disappear entirely. When the patient has recovered from his tracheotomy the treatment of his stenosis must be considered. To lay down any general line of treatment is impossible. One must devise a method which will dilate the stricture and, if possible, cause absorption of the scar tissue. Simple dilatation is seldom practical. Removal of scars is useless unless intubation is employed for months.

Moire and other Continental surgeons are strongly in favour of laryngotomy. Intubation must be practised for twelve to eighteen months, after which the cannula can generally be removed and a plastic operation performed. The voice results are surprisingly good. Moreover, the patients are cured, and can breathe through the natural passages. In the hands of Professor Moire laryngo-tracheotomy doubtless gives good results, but it is not an operation to be undertaken lightly. Harmer agrees that in every case of 'retained tube' the question of curing the stenosis should be carefully considered; but it still remains to be proved that this cannot be effected equally well by simpler methods.

To maintain the lumen of the air-passage it is necessary to persevere with dilatation by bougies, intubation tubes, or upward-turning tracheotomy tubes. The treatment must be commenced very quietly, as the tissues are often intolerant when inflamed. Small-sized stenosis cannulæ are generally effective, and should not be changed too often. If necessary a general anæsthetic should be given for changing the plug at the beginning of the course. After a time a larger cannula can nearly always be inserted without damage, and if surgeon and patient are sufficiently tolerant many

cases can be cured. The patient should wear a tube corked for months before it is finally removed.

As regards paralysis, there is evidence to show that a small proportion of the cases of abductor paralysis recover. Moure quotes a case in which the paralysis disappeared after the evacuation of a peri-oesophageal abscess through the pharynx. Körner also has seen recovery of abductor paralysis. On the contrary, total paralysis supervenes in a small number of patients.

Although two-thirds of larynx wounds recover after a time, in battle many lives are lost owing to wounds of the neck and larynx. Even the survivors may be crippled by complications.

Guisez² makes a valuable contribution on the diagnosis and treatment of *laryngo-tracheal war wounds*, lesions which are relatively infrequent, often difficult to diagnose precisely except by direct laryngo-tracheoscopy, and usually necessitate tedious patient treatment for their relief. Out of 2041 war injured, the total number of those wounded in the larynx, trachea, and œsophagus was 69 in the oto-rhino-laryngological centre of the tenth district. Of the 69 patients under his charge, 42 had laryngeal lesions, and 3 at the same time wounds of the upper part of the trachea. In 10 there was a lesion of the recurrent laryngeal nerves, 7 showed lesions of the trachea, and 7 of the œsophagus. The most constant and pathognomonic sign of such lesions is subcutaneous emphysema of the neck, thorax, etc., together with marked dyspnoea and often with blood-stained, frothy sputum.

Of the various examples of injuries in these regions that are illustrated in Guisez's paper we reproduce those shown in Fig. 95 and Plate XXIX.

The treatment of laryngeal stenosis by cicatricial bands which Guisez has found most satisfactory is by a laryngostomy and keeping the laryngeal wound open after excision of the bands until a complete cure of the stenosis has been effected. But he avoids tamponning the cavity immediately after intervention, and he finds he can avoid the formation of

necrotic debris which result from plugging the wound sufficiently firmly to keep the dressing *in situ*, and the consequent interference with the circulation of the compressed tissues.

REFERENCES.—¹*Lancet*, 1918, i, 839; ²*Presse Méd.* 1918, Feb. 21, 97.

LEISHMANIASIS.

Sir Leonard Rogers, M.D., F.R.C.P.

Kala-azar.—J. W. Cornwall and T. K. Menon,¹ in a fourth paper on kala-azar investigations, report that they have been unable to cultivate the parasite from the rectum of bugs infected with the flagellate stage, which makes infection through the fæces of the insect very unlikely. The flagellate stage only survives in the bug up to twenty-nine days, and as a rule probably not more than fifteen days. They suggest that infection might possibly take place through a bed-bug harbouring the flagellate stage being crushed while feeding. R. Knowles² has investigated the possibility of the human stage of the *Leishmania donovani* passing into an ankylostomum and being transmitted by its ova to soil, as such a theory would explain the way in which the infection

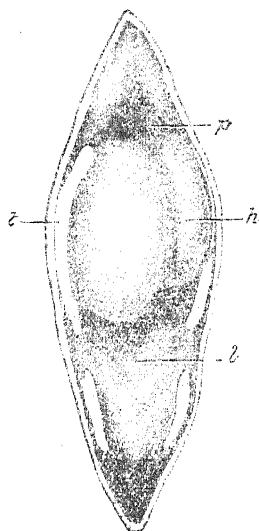
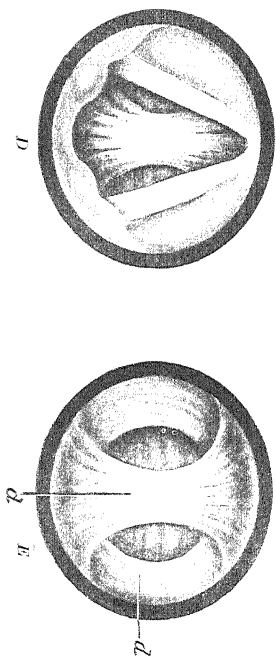
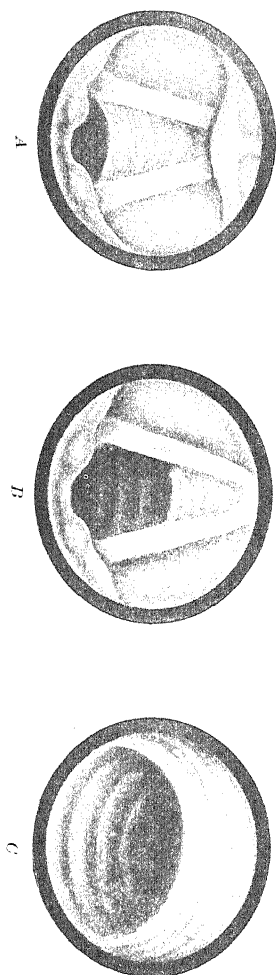


Fig. 95.—*h* Double hernia of the œsophagus; *p*, Pharynx; *t*, Section of the thyroid cartilage; *l*, Cavity of the larynx.

PLATE XXIX.

LARYNGOTRACHEAL WAR WOUNDS

(DR. GINSZ)



Figs. A, B, C show the three aspects of a subglottic chinked band, according to the method of examination : *A*, Indirect laryngoscopic appearance ; *B*, Direct laryngoscopic appearance ; *C*, Tracheoscopic appearance.
Figs. D, E, Identical infundibular diaphragm following bullet wound : *A*, Direct laryngoscopic appearance.
Figs. B, C, Tracheoscopic appearance. Note the very curious aspect (*d*) presented, and that respiration can only take place through the two lateral orifices (*b*).

clings to houses or their immediate neighbourhood. He obtained ankylostoma ova from the stools of kala-azar patients, and bred out embryos from them, but a year's work failed to find any trace of the kala-azar parasite in them.

TREATMENT.—J. C. Kennedy³ reports six cases of kala-azar in British soldiers in a typhoid convalescent camp successfully treated and restored to good health by Tartar Emetic, given intravenously. The patients all came from the same regiment, and from closely related sleeping apartments. J. B. Christopherson⁴ relates three advanced cases of kala-azar treated with tartar emetic in the Sudan, one of whom recovered, the other two being too far gone on coming under observation. L. Rogers⁵ records fatalities from tartar emetic in kala-azar due to some decomposition of the solutions, and relates the results of the use of Sodium Antimony Tartrate (which he found to be slightly less toxic in animals than the potassium salt) in eleven cases in Indian patients, with nine cures and two improved in spite of serious complications. [Serious toxic symptoms have since occurred after three injections of sodium antimony tartrate from one flask of the solution, and one Indian patient with leucocythemia, on which the drug was being tried, died. Freshly prepared solutions are indicated. Many other Indians and Europeans have, however, been cured with this solution, which can be given every other day. The ideal treatment has still to be found.—L. R.] A. Longo⁶ states that formerly not more than 4 to 10 per cent of infantile kala-azar cases recovered in Italy, and he reports 17 out of 20 cures by tartar emetic intravenously—a very good result. The figures do not include a number of cases in which the course was not completed for some reason or other, the recovery rate with them being 41 per cent.

H. I. Winifred Kerr⁷ records two cases of kala-azar in adults at Malta treated successfully with tartar emetic intravenously according to Rogers's directions. J. H. Korn⁸ has treated eleven cases at Pekin with tartar emetic intravenously and by inunction without obtaining any cures; but in only one were the intravenous injections continued for more than thirty-six days, and in that case great improvement resulted. The rest had far too little treatment for anything like cures to be possible, no less than six of them being under observation for less than one month.

Dermal Leishmaniasis.—E. D. W. Greig⁹ reports on 76 cases of Oriental sore, mostly from Mesopotamia, treated with 1 per cent solutions of tartar emetic intravenously, and inunctions with the same drug. Most were verified microscopically, but in a few the organism was not found. The cases treated with intravenous injections gave the best results, but it was necessary to give from 7 to 10 c.c. of the 1 per cent solution to be effective, while although this acted rapidly in most cases, in a few greater resistance to the drug was met with. J. B. Christopherson⁴ records and illustrates a severe case of naso-oral leishmaniasis of four years' duration, cured by tartar emetic intravenously, in the Sudan, and O. Torres¹⁰ a similar result in a very long-standing case in Brazil.

REFERENCES.—¹*Ind. Jour. Med. Research*, 1918, April, 541; ²*Ibid.* 548; ³*Jour. R.A.M.C.*, 1918, Feb., 209; ⁴*Jour. Trop. Med. and Hyg.* 1918, Oct. 15, 229; ⁵*Ind. Med. Gaz.* 1918, May, 161; ⁶*Pediatrics*, xxv, 449, and *Jour. Amer. Med. Assoc.* 1917, ii, 1038; ⁷*Lancet*, 1918, ii, 45; ⁸*China Med. Jour.* 1918, Jan., 26; ⁹*Ind. Jour. Med. Research*, 1917, Oct., 394; ¹⁰*New Orleans Med. and Surg. Jour.* 1918, Feb., 666.

LEPROSY.

Sir Leonard Rogers, M.D., F.R.C.P.

O. E. Denny¹ has recorded the results of a statistical study of 10,000 lepers in the Philippines isolated in the Cullion leper colony. One-half had been diagnosed in adolescence; 29 per cent gave definite histories of contact with leper relatives, and contact with other lepers could never be excluded. The

commonest relationships were brothers and sisters in 35, cousins in 27, children in 11, and in 7 per cent leper parents. The relations were generally of like sexes, except that more mothers and sons than mothers and daughters were infected. Multiple infections spreading over several generations of the same family were frequent. In only 1 per cent of married lepers was the infection between husband and wife. Among children living in a leper colony for one to ten years, 10.4 per cent became infected, while no less than 44 per cent of children of leper parents living for seven to ten years among lepers became infected. No information was obtained regarding the exact mode of infection. J. A. Johnston² deals with the morphology of the leprosy bacillus based on several thousand examinations. He regards short rods as the most frequent type. He considers granules a sign of a degenerative process. In anæsthetic cases he only found the bacilli in the nasal mucus in 14.51 per cent.

TREATMENT.—Heiser's method of **Intramuscular Injections of Chaulmoogra Oil** has received further trials. H. S. Goghill³ has used Heiser's mixture in doses of from 1 to 10 c.c. for about a year, and reports definite improvement in seven cases. W. W. Cadbury also reports good results with the method in out-patients in China. Pulmonary embolism caused serious symptoms in one case, but recovery took place. One-fifth of the total cases showed arrest of the disease, and nearly one-third of those treated for more than six months to over one year showed arrest. Two cases were treated with intravenous injections of sodium gynocardate (the weaker low-melting-point preparation) for three to four months without benefit.

Gynocardate of Soda has also been further tested. L. Rogers⁴ records details of a series of cases already briefly summarized in last year's ANNUAL, with illustrations. The higher melting-point preparations now issued as gynocardate of soda A gave much better results than the original preparation. P. M. C. Peacock⁵ reports on the use of sodium gynocardate intramuscularly in the Mandalay Leper Asylum, where close on 600 injections had been given in doses up to 24 gr. in 12 c.c. with very favourable results, without a single abscess, although considerable pain and swelling was produced. Dr. Carthew⁶ also reports very favourable results from Siam by combined intravenous and oral administration of the drug. E. Muir⁷ records considerable improvement in the great majority of cases treated in an Orissa leper asylum within three months by the same method.

For bone changes in leprosy, see p. 35.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1917, ii, 2171; ²*Philippine Jour. Sci. (B.)*, 1917, May, 115; ³*Ann. Trop. Med. and Parasit.* 1917, Aug. 23, 205; ⁴*China Med. Jour.* 1918, May, 226; ⁵*Ind. Jour. Med. Research*, 1917, Oct., 277; ⁶*Ind. Med. Gaz.* 1918, March, 95; ⁷*Ibid.* 1918, April.

LEUKÆMIA.

Herbert French, M.D., F.R.C.P.

Further evidence of the value of **Radium** in the treatment of leukæmia is given in papers by Peabody¹ and Giffin.² The advantage of radium over x-ray treatment is that, whereas the latter has to be continued week after week for many weeks consecutively, radium treatment is applicable for three, four, or five consecutive days at a time, with a subsequent interval of six or more weeks before a second application has to be made. The advantage of such intervals free from active treatment is, from the patient's point of view, obvious, so that, given only equal results from the two therapeutic lines, there is more to be said for radium than for x rays. Evidence is accumulating to show that, instead of equality of results, radium is even better than x-ray treatment, though the effects in either case are palliative only. Giffin gives details of 30 consecutive cases of myelogenous leukæmia treated by the surface application of radium over the enlarged spleen with a dosage of 50 to 100 mgrms.

The best protection was found to be 2 mgrms. of lead and $\frac{1}{2}$ in. of wood. The splenic area was mapped out into squares after the manner described by Ordway, and the radium was applied over each square for from two to four hours at a time, with a total exposure of from twenty-five to thirty-six hours. A degree of general improvement occurred in every patient, even in the most advanced and toxic cases, and the amount of improvement was remarkable in 13, though we do not yet know whether life was prolonged as the result. The size of the spleen and the total leucocyte-count diminished rapidly in the same kind of way as they do after x-ray treatment; and even if the improvement is but temporary, there seems little doubt that the local use of radium over the splenic area promises to be the least troublesome of all present methods of giving at any rate some relief to those who are ill from leukaemia.

REFERENCES.—¹*Boston Med. and Surg. Jour.* 1917, ii, 873; ²*Ibid.* 686.

LIP, PLASTIC OPERATIONS ON. (See JAWS AND FACE.)

LIVER, PERCUSSION OF. (See also BILE-TRACT AND LIVER.)

Herbert French, M.D., F.R.C.P.

Laporte¹ draws attention to a method of defining the liver by percussion, more accurately than has hitherto been the general rule. He used x-ray screening as a means of testing whether he was defining the liver accurately or not when he was percussing, and found that the error when percussion was made in the mammillary line in the ordinary way was always considerable. He found, however, that the error was remarkably little with the following method: "I percuss from above downwards in the mammillary line, laying the end phalanx of my index finger firmly on the chest wall parallel to the ribs, and using a medium strong percussion stroke. At the first change of sound from clear pulmonary resonance to a somewhat duller sound, a line is drawn on the chest wall. Then I place my finger over the liver dullness at the lower costal margin, and percuss with the lightest possible percussion (threshold percussion, so light that over the liver dullness hardly any sound is audible) upward until a slightly more resonant percussion sound is perceived (lower lung border). Another line is placed on the thorax at this point. The true upper liver border lies half-way between these two lines. The important point to remember is that in percussing from above downward one must use a medium strong percussion stroke, and note the very first change of percussion sound; and similarly, when percussing from below upward, employ only the very lightest, scarcely audible, percussion."

REFERENCE.—¹*Med. Rec.* 1918, i, 1126.

LUMBAR PUNCTURE.

J. Ramsay Hunt, M.D.

The indications for and the technique of lumbar puncture are now well recognized. There are, however, a few puzzling phenomena which sometimes result from this very simple and now frequent procedure, among which is the so-called *puncture headache*. Lumbar-puncture headache differs from all others in that, being present when the patient is sitting up, it completely disappears when he lies down. It is throbbing and severe, and felt mostly in the frontal and occipital regions. The pain comes on quickly when he sits up, being fully present in twenty seconds. It takes about the same length of time to subside when he lies down. This situation usually persists for about seven days with full severity, and then ends somewhat abruptly in the course of twenty-four hours.

Regarding causative factors, various speculations have been made concerning the importance of the rapidity with which the fluid is withdrawn; the position of the patient during the puncture; the degree of pressure existing in the spinal fluid at the time of puncture; the disease condition of the patient, and his age.

All these points are now generally regarded as unimportant. R. G. McRobert¹ offers a very ingenious explanation for this interesting symptom which will appeal to most observers who have reflected on the problem: To obtain fluid by puncture, the needle must pierce two membranes, the dura and the arachnoid. The dura forms a rigid, tough, fibrous sac, just within the vertebral canal. The arachnoid tissue, which is non-vascular and delicate in texture, is full and loose, and it is in close apposition to the dura. The fluid is contained in a space between the arachnoid and the pia mater, the latter membrane closely investing the spinal cord.

We are so accustomed to withdraw blood from a vein without an afterthought as to its closure that we have assumed the same mental attitude, unconsciously, after lumbar puncture. But in the latter instance we have punctured a fibrous sac distended with fluid—made a hole in a stiff membrane that has no contractile tissue. A puncture in this rigid dural membrane usually persists as a clean-edged, round hole. The spinal fluid is always under some pressure in its sac, so what is to prevent a continuous leakage into the epidural space in the spinal canal, following the extraction of the needle?

From a study of this point, McRobert has become convinced that closure of the puncture hole usually takes place in the following way: The arachnoid tissue, as it drops from the point of the departing needle, is swept snugly against the dura mater, by the pressure of fluid within. In this way the dural hole is blocked by an intact area of the arachnoid membrane, as the puncture holes, being small, are unlikely to approximate.

If the puncture hole is not blocked, it is because the delicate arachnoid tissue clings around the departing needle, and its hole is pulled into and through the hole in the dura. There it impinges, and this invagination forms a spout or wick for the easy drainage of the whole cerebrospinal fluid sac, and also prevents the rapid healing, which would otherwise occur, of so small a dural opening.

All the fluid secreted by the choroidal glands during seven or eight days—the time seemingly necessary for the hole to close by tissue growth—will be lost by leakage into the epidural space, where it can be absorbed readily, because the epidural space of the spinal canal is comparatively very large, and contains only loose connective tissue, with venous plexuses and lymph-channels.

It is evident, in the light of the foregoing facts, that the amount of fluid collected in the test tube will be no indication whatever of the great loss that occurs when a puncture hole does not become properly occluded when the needle is withdrawn. Thus a continuous leakage of cerebrospinal fluid may take place without any external indications of such an accident, which by diminishing the protective water jacket of the brain may account for the peculiar nature of the headache.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1918, 1350.

LUNG, AFFECTIONS OF.

Arthur Latham, M.D., F.R.C.P.

Treatment of Non-tuberculous Lung Abscess by Artificial Pneumothorax.—W. D. Tewksbury¹ discusses abscess of the lung which follows an operation on the nose or throat. The infection is of the mixed type, with the staphylococcus and streptococcus predominating. The prognosis under ordinary methods of treatment is unfavourable. Forheimer reported 133 cases of lung abscess and gangrene with a mortality of 64 per cent. Tewksbury gives particulars of 10 cases of lung abscess treated by Artificial Pneumothorax. Sixty per cent were cured, 20 per cent improved temporarily, and 20 per cent died. In 4 cases in which the abscess was of less than two weeks' duration, a prompt cure was effected; in 6 cases in which the abscess was of longer duration, 2 patients were cured, 2 were temporarily improved, and 2 died.

Acute Œdema of Lungs.—F. de Havilland Hall² urges that as soon as there are any indications of œdema of the lungs, $\frac{1}{100}$ gr. to $\frac{1}{50}$ gr. of **Atropine Sulphate** should be injected hypodermically, and that **Caffeine Sodio-salicylate** should be employed hypodermically, as a cardiac stimulant, in 2-gr. doses. If there is great cyanosis, unrelieved by an injection of atropine, **Venesection** should be performed. In most cases a **Sinapism** will give relief. The feet should be kept warm by **Hot Bottles**. The room should be warm, but well ventilated; the bronchitis kettle and moist inhalations should be avoided.

Chronic Non-Tuberculous Infections.—James Alexander Miller³ describes a group of cases with definite localized physical signs in the chest closely simulating pulmonary tuberculosis, but in which a close study of the clinical findings and the subsequent course does not justify a diagnosis of tuberculosis. Such cases have been described as "a lobar form of bronchopneumonia," a "localized subacute form of bronchopneumonia," and as "chronic non-tuberculous pulmonary infections." Dr. Miller considers that the chief points which serve to distinguish these cases from cases of tuberculosis are as follows:—(1) Complete absence of severe constitutional symptoms, with the retention of excellent general condition in spite of the presence of extensive lesions; (2) The localization of the lesion with almost constant uniformity in one or both of the lower lobes; (3) The disappearance of all physical signs within a few months in the subacute cases; (4) The lack of progression of the lesion from its original site to other parts of the lungs; (5) The absence of tubercle bacilli in the sputum over long periods of time, and the presence of other infective organisms in predominating numbers; (6) The character of the Röntgen-ray picture, which in these cases shows either nothing abnormal or very slight changes.

X-ray diagnosis in, p. 32.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1918, i, 293; ²*Lancet*, 1918, i, 683; ³*Amer. Jour. Med. Sci.* 1917, ii, 805.

LUPUS ERYTHEMATOSUS.

E. Graham Little, M.D., F.R.C.P.

Wise¹ makes the usual differentiation of fixed discoid lupus erythematosus and the diffuse erythematosus type. The latter he regards as associated with tuberculosis. He thinks little effect can be attributed to the internal administration of quinine or iodoform, both of which have been vaunted. Local treatment is more reliable, and may be classed as (1) sedative and astringent, (2) stimulating, or (3) destructive, each being called for in different circumstances.

1. The first type of treatment is indicated in the acute disseminated form of the disease. Examples of remedies of this class are saturated **Boric Acid Compresses**, wet dressings of 5 per cent **Ichthylol** in water, and **Calamine Lotion** and **Liniment**, for which these formulæ are suggested:—

Calamine Lotion (Ormsby).

R	Pulv. Calamin.	$\overline{3}iv$	Sodii Biborat.	$\overline{5}ij$
	Pulv. Zinc. Oxid.	$\overline{3}iv$	Aq. Calc.	q.s. ad. $\overline{3}viiij$
	Glycerin	$\overline{3}ij$		

Calamine Liniment (Pusey).

R	Pulv. Tragacanth.	$\overline{5}j$	Ol. Olivæ	$\overline{5}iv$
	Phenol c. Glycerin.	$\overline{aa} \text{ } \overline{M}x$	Aq.	q.s., ad. $\overline{5}j$
	Zinc. Oxid. c. Calamin.	$\overline{aa} \text{ } \overline{5}j$	Ol. Bergamot	gtt. $xx-i$

As astringent agents he recommends 2 per cent **Resorcin** in 80 per cent alcohol; 1 per cent resorcin, 5 per cent sulphur. in ung. zinc. oxid.; or these lotions:—

Lotio Alba.

R Zinci Sulphat. ʒi-iv | Potassi Sulphuret. ʒi-iv
 Make separate solutions of each, then add rose water to make ʒiv.

Lotio Alba Compound.

To Lotio Alba, add precipitated sulphur ʒj-ij.

2. As stimulating applications the following are advised: An ointment containing 5 per cent of **Salicylic Acid** and 10 per cent of **Precipitated Sulphur**, with zinc oxide ointment as a base; 10 per cent of **Salicylic Acid**, incorporated in soft soap. **Mercurial Plaster**.

3. **Trichlor-acetic Acid**. **Carbon Dioxide** pencil (or liquid air). **High-frequency spark**. **Ionization**. **X ray**. **Radium**. **Ultra-violet Ray** (Kromayer lamp, Finsen lamp). Ointments of **Pyrogallie Acid** and **Chrysophanic Acid**, in strengths of 4 to 10 per cent. These constitute the cauterant and destructive remedies. The last group of remedies is to be applied only to the fixed lesions, and when these are of small area, and after cautious experimentation of the individual reaction, for details of which the original paper must be consulted.

Weiss and Singer² made a very detailed investigation of twelve cases of discoid lupus erythematosus, with special reference to the presence of tubercle, and found in ten of the twelve positive evidence of tubercle, either active or healed, and suspect tubercle in the remaining two cases. Notwithstanding these figures, the authors deprecate assuming any causal connection between the diseases, on the ground that tubercle is so common ("Fully 90 per cent of adult humanity living in large industrial centres are the subjects of tuberculous infection or tuberculous disease") that no conclusions can be drawn from the association. The histopathology of lupus erythematosus is so unlike that of tubercle, and the disease is so rare as compared with tubercle, that this causation is improbable.

REFERENCES.—¹*Jour. Cutan. Dis.* 1917, Aug., 500; ²*Amer. Jour. Med. Sci.* 1918, ii, 528.

MALARIA.

Sir Leonard Rogers, M.D., F.R.C.P.

A large amount of literature on this subject has been published during the past year, including important observations on the methods of treatment best calculated to prevent relapses.

CAUSATION AND PREVENTION.—M. A. Barber¹ has experimented on the transmission of malaria by Malayan anopheles, and obtained evidence incriminating *A. ludlowi*, *umbrosus*, *aconitus*, *fuliginosus*, and *maculatus*, while *A. rossii* and some others were open to suspicion. E. R. Whitmore² records observations on bird malaria in relationship to relapses of malaria, and favours the simple view that they are due to survival of a scanty infection with the asexual stage of the organism. C. E. H. Milner³ found an intimate relation between malaria and heat-stroke in Mesopotamia. P. Hehir⁴ discusses the prevention of malaria in Indian cantonments, lays stress on the continued use over several years of all the known preventive measures, and records a great reduction of malarial fevers in a number of important places. He notes that a year's residence of infected Indian children in a hill station free from malaria eliminated the infection in 98 per cent of them. All infected persons should be treated with **Quinine** for at least four months, full doses being given for the first three weeks, relapses being thus prevented in 98 per cent. Prophylactic doses of quinine are insufficient in persons already infected, and this accounts for many alleged failures. Such failures have been reported by C. H. Treadgold⁵ in Macedonia, and A. R. S. Anderson⁶ in India; but on the other hand, M. Roche⁷ and K. D. Pringle⁸ report good results with 5-gr. doses daily,

and C. A. Gill,⁹ under war conditions, with 10-gr. doses two days running with two-day intervals. L. Rogers¹⁰ records an analysis of a number of papers on quinine prophylaxis, and concludes that many of the failures were due to its use in places with a high endemic index, where curative measures were necessary and prophylaxis had no chance; and that Koch's system of two doses weekly usually failed, but 5-gr. daily was more successful, while 10 gr. every other day or on Gill's plan seems to be worthy of further trial.

PREVENTION OF RELAPSES.—Advantage has been taken of the possibilities of following up patients and keeping them long under observation in military hospitals to test the value of different dosage and methods of administering quinine in curing the disease, as indicated by absence of relapses, which is much more difficult to obtain than stopping any given attack of malarial fever. The experimental tests have been carried out under the general direction of Sir Ronald Ross, by J. W. W. Stephens, W. Yorke, B. Blacklock, J. W. S. Macfie, C. F. Cooper, and H. F. Carter, and the results have been recorded by the above-named workers in a long series of short papers,¹¹ and have been summarized by R. Ross.¹² The cases were benign tertians, mostly from Macedonia, which is the form of malaria which is well known to be most liable to relapse. The oral administration of up to 30 gr. of quinine on two consecutive days only had no curative effect in preventing relapses; but from 45 to 90-gr. doses were increasingly effective with the rise in the dose, 90 gr. on two days preventing relapses in 62 per cent of the cases; 30 gr. a day for eight weeks was still followed by 79 to 90 per cent of relapses, 45 gr. a day for eight weeks was more effective, but 45 gr. on two consecutive days each week for eight weeks gave still better results, namely only 28 to 38 per cent of relapses, while this course was better borne and much more economical of quinine. It was also found that if a case of benign tertian malaria had not relapsed within four weeks of cessation of the treatment, the risk of a subsequent relapse was 13 per cent, while after six weeks' freedom it was only 5 per cent. Similar tests in malignant tertian malaria would be of great interest. Ross advises a course of **Arsenic, Iron, and Quinine** after the termination of the treatment with full doses of quinine. G. J. S. Archer¹³ has found the plan of giving 10 gr. of quinine three times a day for three consecutive days three times a month for three months effective in preventing malarial relapses.

Methods of Administering Quinine.—Intravenous injections of quinine in malaria are advocated by J. D. Thomson,¹⁴ who gives 15 gr. of bihydrochloride in a 20 per cent solution in malignant tertian and 12 gr. in benign tertian cases, one dose stopping the fever, after which oral quinine is more effective in keeping down the temperature. R. Knowles¹⁵ reports very favourably on the intravenous use of quinine acid-hydrobromide as advised by Rogers, regarding it as the quickest and surest method of immediately cutting short a malarial attack, and infinitely preferable to intramuscular injections of the drug. It is especially valuable in bilious, remittent, algid, or comatose malaria, and he prefers it as the routine method in malaria, while it can be used safely even in advanced pregnancy. He advises five consecutive daily injections, followed by quinine orally. Intramuscular injections of the bihydrochloride, 10 gr. in 12 min. of water, twice a day for two or three days until the fever is controlled, are reported by S. C. G. Fox¹⁶ as the most effective and generally used treatment in Malaya. Leenhardt and L. Tixier¹⁷ also advocate this plan. MacGilchrist¹⁸ records a case in which an injection of 11 gr. of this salt in 34 min. of water was made into the gluteal region, and on the patient dying, thirteen hours after, a post-mortem showed necrosis of the muscle at the seat of the injection. He advises weak solutions for injection.¹⁹ A. W. Falconer and A. G. Anderson²⁰ have combined intravenous injections of 0.2 to 0.4 grm.

of Galyi intravenously with quinine orally, intramuscularly, and intravenously, in severe malignant tertian malaria, with promising results. They also tried Tartar Emetic intravenously, and found that the crescents usually disappeared, but relapses occurred, and no clinical benefit was observed.²¹ T. A. Hughes²² found that this drug only produced curative effects when toxic doses were given, and thus is inferior to quinine.

A. J. Hall, Williams, and Douglas,²³ record two fatal malignant tertian cases occurring in England.

S. I. De Jong²⁴ finds that the Wassermann reaction is a reliable test for syphilis in malarial subjects if carried out during the absence of fever.

A. W. Harrington and W. Whitelaw²⁵ have carefully studied *post-malarial anæmia*, which in severe cases is of the pernicious type. In addition to quinine, Arsenic is the most valuable drug, given in increasing doses of liquor arsenicalis, while in advanced cases Galyi intravenously was of use.

REFERENCES.—¹*Philippine Jour. Sci.* (B.), 1918, Jan., 1; ²*Johns Hop. Hosp. Bull.* 1918, March, 62; ³*Brit. Med. Jour.* 1918, i, 638; ⁴*Ind. Med. Gaz.* 1918, April, 130; ⁵*Brit. Med. Jour.* 1918, i, 525; ⁶*Ind. Med. Gaz.* 1918, Feb., 45; ⁷*Ibid.* 1917, Oct., 349; ⁸*Ibid.* 1918, July, 258; ⁹*Jour. R.A.M.C.*, xxix, 439; ¹⁰*Ind. Med. Gaz.* 1918, July, 249; ¹¹*Ann. Trop. Med. and Parasit.* 1918, Jan. and May; ¹²*Ind. Med. Gaz.* 1918, Aug., 292; ¹³*Jour. R.A.M.C.* 1918, May, 512; ¹⁴*Ibid.* 1917, Oct., 379; ¹⁵*Ind. Jour. Med. Research*, 1918, Jan., 463; ¹⁶*Lancet*, 1917, ii, 909; ¹⁷*Presse Méd.* 1918, March 4, 119; ¹⁸*Ind. Med. Gaz.* 1917, Dec., 426; ¹⁹*Ibid.* Oct., 345; ²⁰*Lancet*, 1917, ii, 486; ²¹*Ibid.* 1917, ii, 743; ²²*Ind. Med. Gaz.* 1918, Feb., 42; ²³*Lancet*, 1918, i, 734; ²⁴*Presse Méd.* 1917, Oct., 617; ²⁵*Glasgow Med. Jour.* 1918, June, 321.

MALIGNANT DISEASE. Radium and x-ray treatment discussed on p. 38.

MALINGERING. (See DEAFNESS, SIMULATED; EAR AFFECTIONS AND MILITARY SERVICE; SKIN AND VENEREAL DISEASE.)

MARASMUS.

Frederick Langmead, M.D., F.R.C.P.

M. S. Reuben,¹ writing from an experience of over 1000 cases of atrophy in infancy, states that if the life of an atrophic infant can be saved, it can be done by the use of properly modified, clean bottled milk with the addition of suitable carbohydrates.

Marasmus is not a disease. It may be due to various causes, and after we have determined that no other condition is present, and that it is due to nutritional disturbance, we have still to decide on the exact nature of that nutritional disturbance. In every case we must recognize all the causes which are responsible, and as in no two cases will be found exactly similar exciting causes, in no two cases will the treatment be the same.

The most common cause, Reuben states, is improper feeding; but intolerance for milk or any of its constituents is the least common. Of the intolerances, that for *fat* is most frequent (70 per cent), for *sugar* less frequent (20 per cent), and for *protein* least frequent (10 per cent).

SYMPTOMS.—The symptoms in *fat indigestion* usually appear slowly or sub-acutely. In mild cases they may be deferred for weeks. In *sugar indigestion* the onset is subacute or sudden, and in severe cases may be fulminating; the symptoms are always manifest from the beginning. The symptoms of *protein indigestion* are the mildest met with in the three forms, and usually slow in development.

The *appetite* is always poor in fat indigestion, and provides a valuable pre-monitory sign. It is good in sugar indigestion except in toxic cases, and little affected in protein indigestion. The *weight* in fat indigestion may not be affected at first, but a stationary weight, when the food is sufficient, should always lead to a suspicion of a mild degree of this disability. Big losses

of weight only occur when the limit of tolerance has been over-reached, and are usually accompanied by diarrhœa. In sugar indigestion the weight depends on the frequency of stools and the amount of water they contain. There may be a gain in spite of four or five loose stools daily; but with many watery stools the loss may amount to 2 or 3 lb. a week. If there is marked gain in weight, one should always look for œdema. In protein indigestion the weight is little affected.

TREATMENT.—1. Complete history and complete physical examination of the infant are essential to determine the cause of the malnutrition.

2. The first aim should be to prescribe a food which will preserve life and correct existing gastro-intestinal symptoms. The first step is a period of repair; when the symptoms have subsided, we must prescribe a food which will produce a regular gain in weight and proper development.

3. We must not keep the infant long on an ill-balanced diet, which may be necessary at first to correct existing conditions.

4. The symptoms having subsided, the food must contain a minimal amount of that element for which there is intolerance, the other elements being correspondingly increased to supply sufficient calories.

5. The more an infant is under-weight, the greater is the requirement, but no infant should receive its full requirement at the beginning of treatment.

6. The more an infant is under-weight, the greater is the amount of water needed, and the quantity given should be less than the age but more than the weight would indicate.

7. No infant should receive more than seven meals in twenty-four hours, and the intervals should never be less than three hours.

8. Never change the formula without a definite reason, or before the infant has had time to adapt itself to it. All increases in strength of the food must be cautious and gradual.

9. Bodily heat must be maintained by the use of cotton jackets and external heat.

10. Proper airing and bathing are indispensable adjuvants.

11. Frequent and regular observations are essential.

He deems it advisable to wash out the stomach of every atrophic infant when the treatment is first undertaken. One-tenth of a grain of Calomel is then ordered for every month of the child's age, and only plain boiled water allowed until next morning. Marasmic infants cannot withstand starvation for more than twelve to twenty-four hours. The existing symptoms are then corrected. When there is much vomiting the stomach is washed out daily, and the intervals between the feedings are not less than three and a half to four hours. The feed should not contain a high percentage of fat, for this is the element which is most apt to delay emptying of the stomach. Infants with a tendency to looseness of the bowels, passing four to six green stools with curds and mucus, should be put on a mixture which is low in sugar, with a moderate amount of fat and a high proportion of protein. As no infant will gain in weight on a mixture which contains little carbohydrate, dextrin-maltose or flour should be added gradually when the diarrhœa has been controlled. When the infant is able to take 5 or 6 per cent of carbohydrates, it should be put on a whole-milk mixture, or a skim-milk mixture with a high percentage of carbohydrates if the infant is much under weight.

"*Curdled Low-sugar Milk.*"—A mixture low in carbohydrates and containing a moderate amount of fat and a high proportion of protein can be made from a bottle of whole milk, as follows:—

Shake the bottle of whole milk until the cream is thoroughly mixed with the remainder. To a pint of this milk add two junket tablets, and allow it

to stand for half an hour. Then strain and discard the whey. The curd is rubbed through a fine sieve into the other pint of milk, and enough plain boiled water added to make it up to the quart. The whole mixture is now brought to the boil and is ready for use. No more than a quart should be given in twenty-four hours.

Atrophic infants without gastro-intestinal symptoms should be put on mixtures made from properly diluted whole-milk, or, if they are very badly nourished, on skim-milk with a high proportion of carbohydrates.

In cases of fat intolerance, skim-milk should be used with a high percentage of carbohydrates. With sugar intolerance, top-milk dilutions with an addition of carbohydrates may be used, or the mixture described above. In protein intolerance, whey may be used, and the amount of protein gradually increased by adding more and more curd to the mixture. Protein digestion may be facilitated by the use of **Alkalies**, of cereal diluents, and of **Sodium Citrate**, or by boiling, peptonizing, or homogenizing. Usually all that is necessary is to bring the milk to the boil.

A careful study has convinced the writer that skim-milk, although not suitable for healthy infants, is of great value as a temporary food in chronic cases of malnutrition, in which the infants present gastro-intestinal symptoms and are much under normal weight. Skim-milk with a high percentage of carbohydrates produces a more rapid gain than any other mixture. Such a mixture is especially indicated in cases of (1) fat intolerance, (2) malnutrition due to underfeeding, (3) malnutrition following acute infectious diseases, (4) malnutrition without gastro-intestinal symptoms, (5) weaning, (6) premature and congenitally feeble infants.

The procedure recommended is as follows:—

1. Determine the kind of milk which is indicated (whole, top, skim, or 'curdled low-sugar' milk).

2. Determine the quantity to be given and the number of meals.

3. Calculate the calorie requirement; in the first feed it is seldom advisable to give more than 30 to 35 calories to the pound. Steadily increase this until the full requirement is covered and the infant begins to gain weight.

4. Never change the formula without definite reason.

5. Increase quantity of a meal by half an ounce every two or three weeks, but not up to more than 42 oz. in twenty-four hours for an infant under one year old.

6. Give other articles of food, such as fruit-juices, cereals, vegetables, beef-juice, yolk of egg, before the infants reach the normal weight for their age.

7. Flours have a greater field of usefulness for infants in whom there is a tendency to looseness of the bowels, than for healthy infants. Of the sugars, dextrin-maltose preparations are most useful for atrophic infants, because they are less likely to cause diarrhoea and produce the greatest gain in weight. Lactose is the most laxative. No infant should be kept on a mixture containing over 10 per cent of carbohydrates for any length of time.

8. When skim-milk is ordered, the first meals should not contain more than 1 per cent of fat, which is that of the residue of a quart of milk when the top 8 oz. have been removed after standing. When a fat-free milk is required, the fat must be removed by centrifugalization. Later, 1½ per cent of fat is allowed, obtained by removing and discarding only the top 6 ounces. By reduced skimming the fat is gradually increased, and with this increase the carbohydrates are gradually diminished.

9. When top-milk is indicated, begin with a 10 per cent milk, obtained by using only the upper 6 oz. of the quart bottle. As tolerance for carbohydrates

improves, the fat is gradually reduced and partly replaced by them. The top 12 oz. contains 9 per cent milk.

10. When a low-sugar milk is used, the infant should be kept on this mixture until soap stools are obtained.

REFERENCE.—*Med. Rec.* 1918, July 13, 57.

MASTOIDITIS. (*See OTITIS MEDIA AND MASTOIDITIS.*)

MEASLES.

J. D. Rolleston, M.D.

BACTERIOLOGY.—R. Tunnicliff¹ has isolated Gram-positive diplococci in anaerobic cultures from the blood of measles and rubella patients. The measles diplococcus is small and round; the rubella diplococcus is larger, elongated, with pointed ends and a capsule. Similar diplococci were also isolated from the throat, nose, eye, and ear of measles patients, and the throat of rubella patients. Morphologically identical organisms were found in smears taken from the tonsils and anterior pillars of the fauces early in these diseases, and disappeared with the abatement of the throat affection.

SYMPTOMS.—Godlewski² has found that if a dry cupping-glass is applied to the skin three days before the eruption of measles, a reddish circle appears. If applied forty-eight hours before the eruption, this circle becomes much wider and the colour deeper; twelve hours before the eruption it is still wider, and the colour becomes purple. The erythema reaches its height in three and a half minutes and then subsides, in some cases persisting for ten minutes. The test was applied to 218 persons, including children and adults, 18 of whom gave a positive reaction and developed measles four or five days afterwards. If this test is confirmed by subsequent experience, it will prove useful in camps and institutions where it is desirable to isolate cases of measles before the appearance of the eruption.

E. Meyer³ draws attention to the swelling of the plica semilunaris, i.e., the fold of skin connecting the two lids at the internal canthus, as a prodromal sign of measles. In contrast with other infectious diseases connected with conjunctivitis, the plica semilunaris in the prodromal stage of measles shows a high degree of inflammation, and small white spots resembling Koplik's spots, while the adjacent caruncle is only slightly affected. Meyer attaches much diagnostic value to this sign, as it usually appears before Koplik's spots on the buccal mucous membrane, and vanishes before the appearance of the measles eruption.

The high mortality from measles during infancy is illustrated by J. G. Wilson,⁴ who regards the figures as sufficient to warrant a conservative attitude towards the practice of inoculation against measles recently recommended by Herrman. For the five years ending July 1, 1916, out of 2614 cases treated at the Contagious Diseases Hospital at Ellis Island, there were 32 under six months of age; 7 of them died, a mortality of 21·8 per cent. Of the 32, 18 were under five months, of whom 5 died, giving a case mortality of 27·7 per cent for infants under five months. B. S. Veeder⁵ states that the average annual death-rate from measles for the registration area of the United States for the decennium 1904–13 was 10·2 per 100,000 of the population, so that over 9000 deaths on an average occur annually from measles in the United States. Of the deaths, 80 per cent occur under five years of age, and 53·3 per cent in infancy. Measles reaches both its absolute and relative height as a mortality factor in the second year of life. According to Herrman,⁶ infants under two months of age are absolutely immune. The immunity is not conveyed through the breast milk, as artificially-fed infants are also immune, but probably through the placental circulation. The immunity gradually becomes

less absolute, so that at eight months it is apparently entirely lost. When infants between three and five months are exposed to infection, and do not contract the disease, they are frequently not infected when exposed to measles in later life. The contact must be intimate, and the accidental inoculation must be after the third month, because before that time, immunity being absolute, there is no reaction, and no immunity is conferred.

R. L. Levy and H. L. Alexander⁷ have found that streptococcus carriers are specially liable to the complications of measles. Of 388 soldiers suffering from measles, 299, or 77.1 per cent, were found to be carriers of *Streptococcus hæmolyticus*; 119 cases, or 30.6 per cent, developed in order of frequency one or more of the following complications: bronchopneumonia, acute tonsillitis, acute bronchitis, acute suppurative otitis media, empyema, acute sinusitis, peritonsillar abscess, erysipelas, cervical adenitis, peritonitis, and septic meningitis. The incidence of the complications was 36.8 per cent among the streptococcus carriers, as compared with 6.4 per cent among the non-carrier cases. Bronchopneumonia occurred 47 times, or in 12.1 per cent of all cases, and caused many deaths. Of the bronchopneumonia patients, 15, or 34 per cent, developed empyema. Cultures of pleural fluids and pus from the ear for the most part showed *Streptococcus hæmolyticus*. (See also STREPTOCOCCUS INFECTIONS.)

PROPHYLAXIS.—A. B. Marfan⁸ recommends that a child exposed to measles should not be isolated until the tenth day, when he should be watched for signs of the disease. If no symptoms develop, the isolation can be stopped in five days, i.e., on the fifteenth day after exposure. If a child develops 'a cold,' and shows slight malaise during an epidemic of measles, he should be isolated at once for five days, and then released if no eruption appears. The measles patient need not be isolated for more than five days unless there is concomitant pneumococcus or streptococcus infection, when additional isolation is required. Terminal disinfection is not necessary in measles except when it is complicated by pneumonia. When an epidemic of measles breaks out in a school, the children should not be given a vacation, as this would help to spread the disease. All that is necessary is to isolate the sick, suspects, and doubtful cases, and keep the rest under observation.

Carriers probably play a larger part in the transmission of secondary infections than they do of measles proper.⁹ The danger of spreading secondary infections during convalescence can be removed to a great extent by wearing gauze masks that cover the nose and mouth. The face mask not only prevents infection through droplets that pass directly from one patient to others, but also prevents escape of droplets that would fall to the floor and, after drying, be distributed in dust. While the measles virus is short-lived outside the body, and is readily killed by unshine and abundant airing, the organisms of secondary infections retain their vitality and pathogenic properties for a considerable time.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1918, ii, 104; ²*Bull. Soc. Méd. Hôp. de Paris* (abstr. *Jour. Amer. Med. Assoc.* 1918, i, 962); ³*Berl. klin. Woch.* 1918, 402; ⁴*Arch. Pediatr.* 1917, 241; ⁵*Ibid.* 321; ⁶*Ibid.* 38; ⁷*Jour. Amer. Med. Assoc.* 1918, i, 1827; ⁸*Le Nourrisson* (abstr. *Jour. Amer. Med. Assoc.* 1918, ii, 777); ⁹*Jour. Amer. Med. Assoc.* 1918, ii, 659.

MENIÈRE'S DISEASE. (See VERTIGO.)

MENINGEAL HÆMORRHAGE. (See BRAIN, SURGERY OF.)

MENINGITIS.

Glucose injections in (p. 4).

MENINGITIS SYMPATHICA.*J. Ramsay Hunt, M.D.*

I. Strauss¹ reports ten cases of this interesting complication of cerebral affections, and indicates its importance as a diagnostic criterion. Meningitis sympathica, so named by Plaut and Schottmüller, is a condition of the cerebro-spinal fluid caused by inflammation in the neighbourhood of the meninges. It is characterized by an increase in the pressure of the fluid, which sometimes registers as high as 400 mm. There is generally a considerable or moderate increase of the albumin content and cellular elements. The cells are usually polymorphonuclear leucocytes, but occasionally they are lymphocytes. The fluid, which may be clear or turbid, is sterile. There may be symptoms of meningitis. Brain abscess is one of the most frequent causes of meningitis sympathica, and the latter condition may be of great assistance in the diagnosis of the former. This is especially true of cases in which there has been a previous otitic inflammation with or without mastoid or lateral-sinus involvement. The picture of meningitis sympathica may be present in cases in which there has been a subarachnoid hæmorrhage, and enough time has elapsed to allow for the disappearance of most of the red blood-cells. The reaction of the meninges in these patients is shown almost invariably by a very marked increase in the lymphocytes, and if the fluid does not show the presence of red cells, the origin of the lymphocyte content is suggested by the peculiar yellowish tint of the fluid. This colour is always diagnostic of hæmorrhage unless there is reason to suspect a tumour or obstructive inflammatory lesion in the neighbourhood of the spinal cord.

REFERENCE.—¹*Amer. Jour. Med. Sci.* 1917, 748.

MENTAL DISEASES.*Bedford Pierce, M.D., F.R.C.P.*

Seeing that during the past two or three years the younger physicians in almost all the so-called civilized nations have been called away for military service, and the older men remaining at their posts have been overwhelmed with routine work, it is not surprising that research in psychiatry has languished, and there is little output of new work to record.

In Great Britain the War has resulted in a considerable decrease of declared insanity. In the case of men, the lessened incidence of insanity is in part due to so many being sent to military hospitals, and consequently not being included in the official numbers in the blue-books. But the decrease is also marked in women. The explanation is probably to be found in the improved circumstances of the labouring classes and the reduction of poverty and unemployment; and this view is confirmed by the absence of any notable decrease in private patients able to contribute to their maintenance.

The psychoses and psychoneuroses directly attributable to the War are referred to elsewhere (NEUROSES OF WAR, p. 302).

ETIOLOGY.—The divergence of opinion as to the causes of insanity shows no sign of closing up. There is now perhaps less insistence on hereditary factors, and more upon the effects upon the brain and nervous system of toxic agencies. Many writers consider disorder of the ductless glands and endocrine organs of the first importance, whilst others think these are often but secondary effects of emotion or other psychical influence. Again, some make much of the action and counteraction of the sympathetic and autonomic systems. New aspects of the problem of mental disorder are constantly being opened out; much new light is being thrown in dark places; but the essential mystery is as obscure as ever.

The causes of mental disease are discussed in a most helpful way in a little volume by Bernard Hart.¹ He points out that the chain of causes is made up of both mental and physical links in every case, although their relative

importance varies greatly in different types. Thus, the symptoms exhibited may arise from the constitutional make-up, the condition of the brain or other organs, mental disturbance, the bodily effect of mental disturbance, the mental effects of bodily conditions; and in many cases the real importance of any one of these factors cannot be estimated. Frequently "the physiological and mental causes are so intricately interwoven that their unravelling is a problem of extreme difficulty. . . . At present it seems possible to accomplish something by both physiological and psychological methods of treatment; but until the various causal factors and their mode of action have been determined, it is impossible to say which of these methods will ultimately prove the most effective. The great need is for investigation and research. . . . But there is one group in which it is becoming more and more certain that 'mental factors' constitute the most important link of causation, and this is the group which we have called 'nervous disorders.' We have, indeed, reached the paradoxical conclusion that while in many 'mental' disorders mental actors play only a minor part amongst the causes which have produced them, in 'nervous' disorders these mental factors are of fundamental significance."

Following this, Bernard Hart deals with the nature of the psychological investigations: "It must discover the jarring elements and warring forces, then proceed to re-arrange them, and thus help the patient to recover the internal harmony he has lost. . . . If we all look through distorting glasses when we seek the causes of our own ideas and acts, these glasses are vastly more distorting and obscured in the case of nervous patients. . . . Again, everything is not on the surface of the mind, and the phenomena on the surface may effectually conceal elements of a very different kind lurking beneath. Thus a sparkling wit may conceal gnawing sorrow, and boisterous and aggressive conduct may be the cloak beneath which is an agonized shyness and diffidence. These buried elements often express themselves in astonishingly indirect ways, and here again the distorting processes are much more pronounced and intricate in the nervous patient. . . . It is indeed to processes of this type that many of the protean symptoms of nervous disorder are due."

Hart's valuable lecture concludes by pointing out the serious lack of facilities for early treatment of mental disorders in this country, and the urgent need for systematic research.

PATHOLOGY.—In an elaborate research into the microscopic characters of the Rolandic area, both in the sane and insane, John Turner² concludes that variations in the width of the cortex and its various laminae depend upon innate factors not markedly altered in insanity or in old age. On the other hand, he considers the existence of an undue proportion of Betz cells of the axonal type is associated with mental disorder. These cells form a rough index of the stability of the brain; a brain with a high percentage is the more likely to break down, and according to this criterion the brain of a precocious dement is the most unstable of all. These conclusions were confirmed by comparing the ascending frontal and paracentral sulci in fifty asylum cases with a like number obtained from a London general hospital.

Turner's findings in regard to the width of the cortex do not harmonize with those of Taft,³ who—referring, however to a different area of the cortex—states that in dementia præcox, and to a greater extent in senile insanity, there is a relative deficiency of grey and white matter, indicating some measure of local atrophy.

MENTAL DEFICIENCY. FEEBLE-MINDEDNESS.

The problem of the feeble-minded receives much attention in the United States, and its systematic study appears to be undertaken more thoroughly than in this country. Prominent amongst the workers is William J. Healy,

of Chicago, whose study of juvenile delinquency has had far-reaching influence. In America there does not appear to be the financial difficulty that obtains in England. Here the social worker and the physician find two almost insuperable obstacles in giving effect to the provisions of the Mental Deficiency Act. On the one hand, the number of institutions available is far below the national needs, and on the other the funds set apart for the care and treatment of the feeble-minded are absurdly inadequate. Hence it is notorious that a large number of defectives in urgent need of institutional care remain at large and untreated.

"What it means to have non-committed feeble-minded in the community," is the title of an article by Carstens,⁵ in which he gives ten typical instances of the extraordinary expense caused by defectives either to the State or to voluntary agencies helping in social work. Kelso⁶ points out the relationship of feeble-mindedness to poverty, giving particulars of several families traced through several generations—5000 Ishmaels in Indiana, 709 Jukes in New York State, 737 Hill folk in Massachusetts, 784 Nams, in all of which families the great bulk of the members were a burden and expense to the community in one way or another.

Cornell,⁷ whilst not doubting the value of the Binet test and its modifications, points out that it can only form a part of the psychological examination of the feeble-minded child. He urges careful individual investigation. Children should be received in the first place in a special children's hospital for a period of two weeks, during which time a study is made of the mental reactions as well as of the physical condition. From this hospital the patient is moved to the appropriate institution. The inadequacy of the medical staff in most institutions is considered serious, leading to the great bulk of the feeble-minded receiving little else than custodial care. "Treat, train, and socially adjust, forms the therapeutic triad."

Macready⁸ urges the importance of a scientific diet for defective children, and states that many children, even of the well-to-do, do not get enough to eat. Open-air life, sleeping in the open, sun baths, swimming, dancing, are all strongly recommended. Few drugs are given, but **Polyglandular Extracts** are stated to have been of great value. For males: cerebrin, didymin, thymus, of each 1 gr.; pituitary and suprarenal, of each $\frac{1}{2}$ gr. For females: cerebrin and thymus, of each 1 gr.; mammos, suprarenal, varium, of each $\frac{1}{2}$ gr.; pituitary and thyroid, of each $\frac{1}{4}$ gr. (*See also p. 21 for the influence of the galvanic current in cases due to prolonged illness.*)

Anderson⁹ contrasts the feeble-minded and the psychopathic offenders in court. The level of intelligence of the former is usually below 11 years mental age, the latter much above this; the former fail to reach a proper standard of intelligence, the latter fail to adjust their peculiar personality. When liberated on probation, the feeble-minded did much worse than the psychopaths.

Everyone interested in the correlation between mental capacity and the anatomical features of the brain should study Sano's¹⁰ careful account of the brain of James Henry Pullen, the genius of Earlswood. A brief clinical history is given. Pullen was admitted to Earlswood when 15. He was deaf, could only speak a few isolated words, and was unable to express himself in writing. He exhibited remarkable powers in handicrafts, and was extraordinarily persevering and self-satisfied. At 26 he made a model of the universe as a barge, with twelve oars, containing mystical figures. At 35 he began his model of the *Great Eastern*, which took seven years to complete, every screw and pulley of which he made himself. He made multitudes of carvings in ivory and wood, mannequins, man-traps to guard his treasures, showing wonderful, yet ill-directed, originality. Further particulars are given in Tredgold's book

on mental deficiency.¹¹ Sano describes in great detail the cranium and brain, giving minute particulars of the various lobes, sulci, and convolutions. Although no definite conclusions are drawn, the account is of great interest, and supports the view that high development of the occipital lobes is associated with artistic skill.

"The brain is small; its frontal and temporal lobes are badly developed; there is a lack of complexity in the convolitional pattern of these lobes, and this is especially marked in the speech centres; his deaf-mutism was more central than peripheral in origin. The parietal lobes were not so bad; the occipital lobes were good, the corpus callosum was remarkable, and he was bound to have special capacity in the visual sphere of his mental existence." The author concludes, quoting Carlyle, "This world, after all our science and sciences, is still a miracle; wonderful, inscrutable, *magique* and more, to whosoever will *think* of it." And so was Pullen."

DEMENTIA PRÆCOX.

It is sometimes said that the treatment of any disease for which a large number of remedies is vaunted is always unsatisfactory. The prospect of cure may be said to be in inverse proportion to the number of infallible remedies.

This cynical view of medicine is perhaps the more justified in dealing with a symptom-complex such as dementia præcox, the pathology of which is unknown, the etiology obscure, and the symptoms inconstant without any definite physical signs. This malady, however, is so common, and the residue of unrecovered patients so large, that the appearance of the quarterly journal, *Dementia Præcox Studies, a Journal of the Psychiatry of Adolescence*, is very welcome. Although the number of recoveries reported by very diverse means is difficult to reconcile with current views as to the unfavourable prognosis in this disease, the facts recorded are suggestive and encouraging. Inside the cover will be found the statement that in the United States 130,000 dementia præcox patients are in custody, and that 15,000 are admitted each year. This disease is said to cost the State Treasury more than any other disease, and the problem it presents "is the greatest, the darkest, and the saddest problem of State medicine."

Guthrie¹² gives notes of five cases treated by **Isotonic Salt Solution** administered intravenously. The number of injections varied from 3 to 17, and the quantity was usually 500 c.c., the maximum given at one time being 1000 c.c. The most striking case was that of a woman, age 40, who was emaciated, had been forcibly fed for more than a year, was mute, and resistant, and within twenty-four hours after the first infusion ate her first meal. After the sixth she began to take an interest in her surroundings and steadily recovered. Guthrie states she had been pronounced a case of incurable dementia præcox by competent physicians. He had agreed in the diagnosis and prognosis, and commenced the treatment without faith in results. Susan¹³ gives an abstract of 10 cases similarly treated by Ishida with striking success. Bondurant¹⁴ relates a case of a girl, age 16, with symptoms resembling hebephrenic dementia præcox, who recovered after the removal of hookworms by the administration of purgatives and thymol. Bayard Holmes,¹⁵ the editor, quotes three cases of a similar character in Brazil, and expresses the opinion that the toxins which produce insanity are frequently present in the brain of young persons, but it is not until this is reinforced by some other toxic substance, such as that produced by hookworms, that definite mental disturbance arises. Wilse Robinson¹⁶ gives three cases of catatonic stupor which recovered after repeated **Lumbar Puncture**. In each case the spinal

pressure was high (in one as much as 360 mm.). Fluid was withdrawn at intervals of about every three weeks, and from 10 to 20 c.c. each time, until the pressure approached the normal. In one case the patient when first admitted was found to have a subnormal spinal pressure; afterwards he became stuporous, with extreme cataleptic rigidity, when the spinal pressure rose; this was relieved by puncture once a month until definite signs of recovery appeared. The stupor is attributed to increased cranial pressure interfering with the blood-supply of the cortex.

In the Report of the Psychopathic Research Laboratory, Cook County Hospital, Chicago, Retinger¹⁷ gives details of the application of the Abderhalden tests in dementia præcox, but no conclusions are reached.

An article by Kojima¹⁸ on the endocrine organs supports the view that there is some essential connection between them and dementia præcox.

MANIC-DEPRESSIVE INSANITY.

The extreme difficulty of preventing recurrent attacks in manic-depressive insanity is recognized by everyone, and Pierce Clark,¹⁹ in discussing the subject, quotes Bianchi as recommending prolonged residence in an asylum. Other methods, such as avoidance of stress, and general hygienic measures, are also referred to, but hitherto little success has been attained. He gives accounts of six cases treated by **Psycho-analysis** in a modified form for varying periods of time, usually for about six months, and the results were very satisfactory, the more so as several of the patients had passed the climacteric and had large numbers of attacks. In most of these cases facts were elicited showing imperfect adaptation to home conditions, in some dislike to marriage and its responsibilities dependent upon infantile attachments to father or to mother. It is claimed that in response to treatment the family life became happier and more harmonious. Some extracts from two cases may be given in illustration.

"Case 2, a middle-aged widowed woman with one grown son. The first attack, at her son's birth, was a simple retardation, with a refusal to eat and a sense of unworthiness. . . . This depressive attack disappeared in two or three months, and ever since, during a period of twenty-four years, she has had a short depressive attack every five or six months. After ordinary mental analysis had been given, our patient submitted to a partial and modified psycho-analysis lasting over a period of several weeks; since that time, four years ago, she has been entirely free from depression or even any vestigial symptoms supposed to persist even in interval periods. She is busily and profitably employed, has widened her social and community interests, and has a continuously hopeful outlook for the future. Case 5, a woman in the early twenties who had had classic manic and depressive episodes since her seventeenth year. The analysis showed the intensive infantile attachment to the father, and the mother antagonism, the latter openly expressed at three years of age. The analysis was undertaken at the beginning of the sixth depression, following a manic excitement, and continued for six months. The results were shown in a complete readjustment to the mother, brothers, husband, and child. The husband and mother report that 'for the first time in ten years she has been perfectly normal, without nervous and physical symptoms.' She has assumed her social and household duties with content, and says, 'Now I fully understand, and I have assumed all my adult duties and am quite serene and happy.'"

These six cases show striking results; but Pierce Clark promptly admits it is too soon to be sure that the improvement is lasting, and experience shows that in many cases marked fluctuations occur in the frequency of the attacks. It is to be hoped that others will continue and extend this line of research.

GENERAL PARALYSIS.

Cotton and Stevenson²⁰ review four years' treatment of general paralysis with intracranial and intraspinal medication. On the whole, **Salvarsanized Serum** is found the most satisfactory drug. The intraspinal method is only recommended in tabetic cases or in meningeal syphilis, and in other cases better results are obtained by subdural or intraventricular injection. Early treatment is important, and it is claimed that all cases of general paralysis can be arrested and possibly cured if treatment is begun early enough. For intracranial injection a general anæsthetic is not necessary, but merely local anæsthesia with 4 per cent solution of cocaine. An Albee electric drill with a Martel attachment is used for the trephine opening, and is stated not to cause pain. The ventricle is pierced with a Cushing brain cannula, the cerebrospinal fluid allowed to escape, and the serum is then introduced through the cannula. After the removal of the cannula, the scalp flap is sutured, and the patient is able to walk out of the room unassisted. The whole operation takes about nine minutes, and there are usually no after-effects. The serum is obtained after the administration of from 0.3 to 0.6 gm. of salvarsan intravenously, and it is reinforced by adding 0.25 to 1.0 mgm. of salvarsan in normal salt solution. It is claimed that larger and more effective doses of salvarsan can be given intracranially than in any other way. It is urged that all cases of general paralysis should be treated, as it is impossible to decide whether a given case has reached the stage when treatment would be useless.

The treatment of general paralysis by subdural injections of **Neosalvarsan** is reported by Schroder and Helweg²¹ (Denmark). Having ascertained that the serum of patients who had received 45 to 60 egrms. of neosalvarsan intravenously contained no arsenic, it was decided to inject subdurally neosalvarsan dissolved in distilled sterilized water. The dose varied from 2½ to 15 mgrms., and the injections were repeated at an interval of two to four weeks. The first operation was under general narcosis, the trephine opening being in the temporal region; later injections were through the healed-up flap and dura. To be sure that the subdural space is reached, some cerebrospinal fluid should be allowed to escape. The results were unsatisfactory. In one case out of ten there was improvement, but sufficient time had not elapsed to judge whether it would last; in two others there was apparently an arrest of the disease; in three cases, after a temporary improvement, the patients died; and in four no effect could be recognized. In four cases paralysis of the arm occurred on the opposite side to the injection; this was attributed to local inflammatory reaction. Though the results were not encouraging, the authors consider that further experiments should be made, the more so as general paralysis is such a hopeless disorder.

TOXIC AND INFECTION PSYCHOSES.

Norbury and Dollar,²² in discussing the treatment of toxic and infection psychoses, urge the importance of (1) Indefinite rest in bed; (2) Administration of large quantities of fluid by the mouth, or if needful by the rectum, using the drop-by-drop method; (3) Careful observation of the diastolic blood-pressure at frequent intervals in order to anticipate collapse and exhaustion; (4) The continuous bath; and finally, when the time comes for its introduction, (5) Massage, diversions, and psychotherapy, in order to complete convalescence. They believe they have saved several lives by giving fluids in large quantities, which turned the tide in a favourable direction by combating exhaustion.

APHASIA AND MENTAL DISORDER.

Percy Smith,²³ in his presidential address in the Section of Neurology, Royal Society of Medicine, deals with the relation between aphasia and mental disorder. The 46 cases to which he refers fall into four groups: (1) Those in which the mental trouble precedes the onset of aphasia; (2) Those in which it is concurrent or subsequent to it; (3) Cases in which, in spite of severe speech defect, the mental capacity is good; and lastly, (4) Cases in which the speech defect and mental affection were not well marked. Hughlings Jackson is quoted with approval: "To speak is not to utter words, it is to propositionize. . . . Loss of speech is therefore the loss of power to propositionize . . . not only aloud (to talk), but to propositionize either internally or externally, and it may exist when the patient remains able to utter a few words."²⁴ When, therefore, as in the first group, propositions are already morbid, the attack of aphasia makes the ruin more complete. The second group of cases includes several in which the aphasia was but one symptom in the course of rapid deterioration. In two of these the 'law of dissolution' was found to hold. A man who had lived the first nine years of his life in Germany, when 83 could not speak sensibly in English, but made fairly intelligent remarks in German; and a lady who as a child talked Italian habitually, when 81 babbled in that language, but could speak no English. In eight cases apraxia was associated with agraphia without presenting definite right hemiplegia, although the view is taken that apraxia arises from a lesion of the first and second left frontal convolutions. Motor aphasia appears to bear the same relation to the movement of muscles concerned in speech as apraxia to movements of the limbs.²⁵ The third group is the most interesting, especially in relation to testamentary capacity. Three cases of motor aphasia are quoted, in all of which the opinion was given that the patients could understand and execute legal documents. In one of these there was also word-blindness. Percy Smith urges the importance of prolonged careful examination in these cases, and the extreme value of shorthand in taking down the exact words used. He does not consider that the disorder of the mind in such cases as he has observed is only associated with a lesion of a single centre specialised for language, but on the contrary it is associated with widespread vascular and nutritive changes in the brain, such as are commonly found in senile and syphilitic cases.

ENDOCRINE ORGANS AND INSANITY.

Pituitary Gland in Mental Disease.—Beverly Tucker²⁶ relates several cases in which definite psychoses were attributed to excess or deficiency of pituitary secretion. In all, five groups of cases are described; but they fall into two main divisions—those with increased and those with decreased activity of the gland. When over-secretion occurs before puberty, there is sexual and mental precocity, with increase of bodily hair. The psychosis which accompanies over-secretion is marked by prejudices, infatuations, general nervousness, transient hallucinations, hysterical symptoms, and trance states. Skiagrams frequently show large sellæ. In one patient, the administration of an extract of the anterior lobe was followed by recovery; but it was assumed in this case that pre-adolescent over-secretion was followed by diminished activity and under-secretion. More frequent than these are cases in which secretion is diminished, either before or after puberty. In the former, there is delay in sexual development, absence of body hair, and possibly voracious appetite, sugar tolerance, and an increase of fat. The mental symptoms are not marked—usually dullness, lack of ambition, and slow mental reaction. In one case a year's feeding with **Pituitary Extract** resulted in recovery, and in

this case the x rays showed a small crowded sella. The most numerous group comprises cases in which, after normal puberty, there is deficiency of secretion. There may be delayed adolescence, slow pulse, low blood-pressure, and uncontrolled appetite. The mental symptoms closely resemble dementia præcox; the patients are dull, unemotional, and obstinate, with transient delusions and possibly stereotyped movements. Two cases were successfully treated by the administration of the extract of the whole gland.

Hyperthyroidism.—Woodbury²⁷ recommends the use of Goetsch's adrenalin test in detecting the presence of hyperthyroidism. Whilst thinking it probable that there is no specific form of mental disease due to excessive activity of the thyroid gland, he considers that a psychoneurotic syndrome is common. This is often ushered in by a phase of over-efficiency, with great aptitude for detailed work and some degree of excitement, which is followed by a stage of depression and fatigue, with irritability, restlessness, and insomnia. In the excited phase the speech is often incisive, staccato, and clear cut, and there may be deficient power of concentration as the 'nervous break-down' approaches. In the depressed state there are usually no delusions. If there is doubt about the thyrotoxis, Goetsch's test has been found useful: $\frac{1}{2}$ c.c. of 1-1000 freshly-made adrenalin solution is administered hypodermically. The pulse-rate, the blood-pressure, the colour, and the condition of the palms are compared before and after the injection. A rise of more than ten points in pulse-rate and in systolic pressure, with other signs of over-reaction, are to be considered positive, and indicate a sympathetic system sensitized by over-abundant thyroid secretion.

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MUMPS.

J. D. Rolleston, M.D.

ETIOLOGY.—M. Wollstein¹ found that by injecting the parotid gland and testicle of cats with a sterile filtrate of the saliva of children and adults in the active stage of mumps, a condition similar to that of mumps in human beings resulted, a rise of temperature, swelling of the parotid and testis, and polymorphonuclear leucocytosis being noted after an incubation period of five to eight days. The virus was most readily detected in the saliva during the first three days of the disease, was less easily found on the sixth day, and was entirely absent after the ninth day. The virus was also detected in the blood of patients showing severe constitutional symptoms. The serum of recovered cats was found to contain an immune body which diminished or even neutralized the action of the virus of mumps.

SYMPTOMS.—Capitan² records his observations on 700 cases of mumps in a military hospital. The onset was always sudden, and was usually accompanied by a rise of temperature to 100.4° or 102.2°, lasting from one to two days as a rule, sometimes four to five days. In some cases there was no fever throughout the disease. The parotid was most frequently affected, the sub-maxillary less commonly, and the sublingual gland, either separately or in combination with the other two salivary glands, rarest of all. The lymphatic glands often showed a considerable swelling in addition to that of the salivary

glands. In two or three cases suppuration of the submastoid glands was observed. The parotid swelling was often accompanied by redness and swelling of the opening of Stenson's duct. Other symptoms noted were a red and swollen throat, causing considerable difficulty in swallowing, occasional slight otitis, and in rare cases œdema of the front of the neck, with mechanical dyspnoea of laryngeal origin. Capitan draws special attention to a new sign of mumps which was hardly ever absent in any of his cases, viz., enlargement of the spleen. Within the first few days its vertical dullness varied from $2\frac{1}{2}$ to 4 in., and returned to the normal a few days after the end of the disease. The duration of mumps was found to be shorter than is generally supposed. In uncomplicated cases the patient was well in six or seven days. In very rare instances a slight relapse occurred after twelve or fifteen days, and occasionally the glands remained enlarged for a very long time.

Sometimes on the fifth or sixth day of disease, or even as late as the tenth, the temperature would suddenly rise to 102.2° or 104° for two to four days, and then fall gradually to normal. In some cases nothing could be discovered on physical examination, but as a rule the rise of temperature indicated the onset of *orchitis*. The localization of the infection might occur in the tunica vaginalis, the spermatic cord, the epididymis, or the testicle itself. Suppuration was seen in only two cases, both of them subjects with a pronounced tendency to suppuration. The duration of the orchitis varied from six to fifteen days. During the years 1914-16 orchitis occurred in 16 per cent, in 1917 in 15 per cent, and in 1918, when mumps was more severe and complications more frequent, in 25 per cent. Capitan thinks that atrophy of the testicle is much rarer than is commonly supposed, and that the organ usually returns to its normal condition. Among the rare complications noted were a rash resembling rubella but unaccompanied by any other signs of that exanthem, and the occurrence of meningeal symptoms, either alone or in association with orchitis, about the fifth or sixth day. A very few cases developed severe bronchopneumonia, which appeared to be connected with mumps, but on this point a definite opinion could not be given.

In a paper on *mumps meningitis*, Kaunitz³ states that during some epidemics of mumps there appear to be more meningeal complications than in others. As most patients recover after a few days' illness, the meningeal condition is very probably lost sight of, particularly in the milder cases. The pathology is that of a serofibrinous meningitis, in some cases invading the brain tissue and nerves at the base of the brain. The symptoms and signs resemble those of tuberculous meningitis, but the course of the disease is very different. Most patients recover, though in some cases temporary neuritis has occurred. Atrophy of the optic and auditory nerves may take place. The gravest forms are those in which the substance of the medulla or the vagus nerves are affected. Kaunitz reports three cases in children aged four, five, and nine years respectively. In two of them the symptoms were comparatively mild, and might have been mistaken for gastro-intestinal attacks. In the third case there was no doubt of the diagnosis from the first, and the patient's life was probably saved by lumbar puncture, which was not necessary in the other two cases.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1918, ii, 639; ²*Bull. Acad. de Méd.* 1918, lxxx, 197; ³*Jour. Amer. Med. Assoc.* 1918, i, 1448.

MYCETOMA.

E. Graham Little, M.D., F.R.C.P.

A case of mycetoma of a type which some authors would class as an actinomycosis, is fully reported by Mischer.¹ The patient was an Italian by birth, but had lived thirty years in Basel. In 1914 a barrel of ice fell on his foot and a hæmatoma of the dorsum resulted, without, however, an open wound.

Six months later, on the site of the injury, the foot having remained somewhat swollen and painful, a nodule developed which on incision was found to contain pus in which yellow granules were present. These were rich in the organism which Mischler classes as a streptothrix and names *Streptothrix verrucosa*, as its cultures assume a warty type. It grows freely on many media, forming light to dark red, sometimes in early phases white, colonies, is aerobic, and shows preference for carbohydrate and bouillon media. No conidia were seen, and hyphae were not constant. The fungus undergoes early fragmentation, and breaks up into bodies resembling bacilli and cocci. It is Gram-positive and retains Ziehl's stain. Inoculation of the culture into dogs, cats, and, possibly, guinea-pigs, produced granulation-tissue tumours, from which the same organism was recovered in pure culture. The treatment, which proved very successful in removing the clinical manifestations, consisted in the administration of large doses of **Potassium Iodide** and the application of a **Paste** composed of equal parts of pyrogallie acid, salicylic acid, resorcin, venetian tale, and gelanthum. This caused a good deal of pain at times, which was controlled with morphia. The patient ultimately died from extensive visceral tuberculosis three years after the initial accident. The paper contains a valuable summary of previous cases of mycetoma, and discusses classification. It is excellently illustrated.

REFERENCE.—*Archiv. Dermat. u. Syph.* 1917, exxiv, No. 2, 297-442.

MYCOSIS FUNGOIDES.

E. Graham Little, M.D., F.R.C.P.

Fraser¹ gives a very full consideration of the literature of mycosis fungoides, and a personal description of the disease founded on the observation of seven cases. Two of these were, the author admits, more probably instances of Hodgkin's disease, from which, however, it is often difficult to differentiate mycosis fungoides. As the result of very careful histological investigation of the changes in all stages of mycosis fungoides provided by the other five cases, the author gives it as his view that the disease is rather of the nature of an inflammatory condition than a neoplasm. "It is not limited to skin manifestations, but is a disease with general involvement, especially of the lymphoid tissue." In stages earlier than the development of the plaque the histological changes are quite impossible to differentiate from other diseases such as psoriasis and parapsoriasis. Bacteriological and biological investigation was entirely negative. Treatment included **X-raying**; this was often successful in dissipating the eruption, which, however, returned after a certain interval. Itching seems to have been best mitigated by the application of **Sublimed Sulphur**, and by injection of '**Arsenical Preparations**,' not specified. The author insists on the frequency with which the eruption may disappear spontaneously.

REFERENCE.—*Jour. Cutan. Dis.* 1917, Dec., 793.

MYOCARDITIS, CHRONIC.

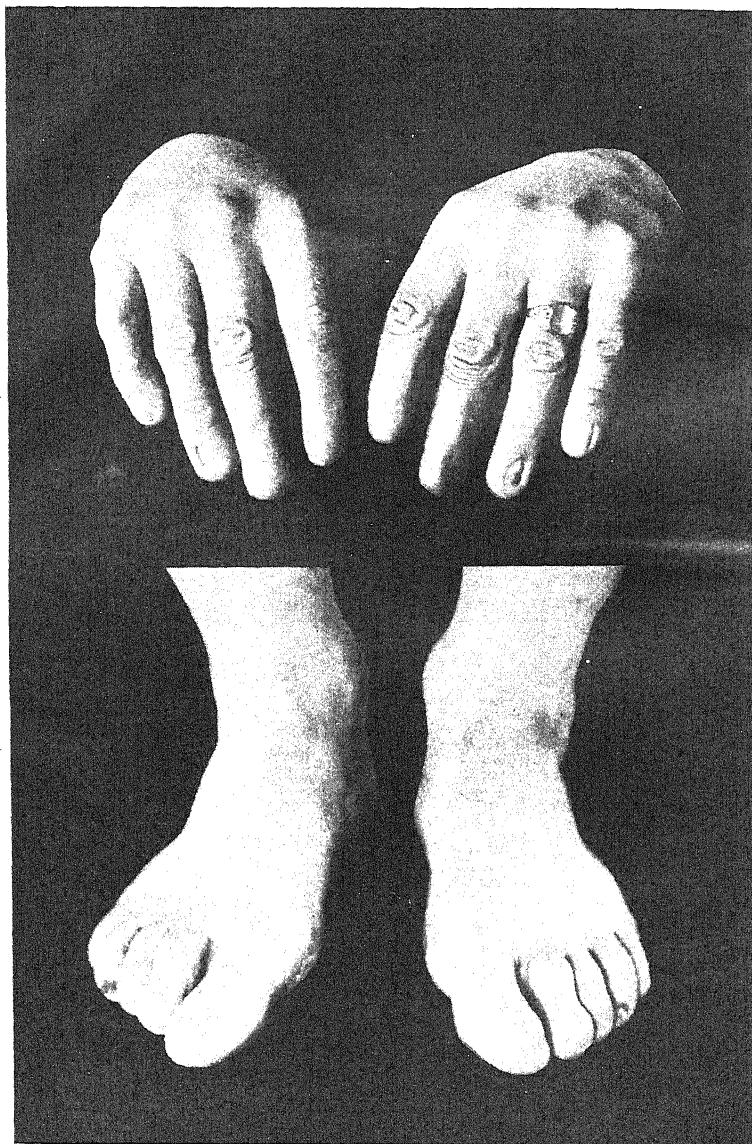
Carey Coombs, M.D., F.R.C.P.

The term used here is applied by Christian¹ to a group of cases which he describes as follows:—

"There is a common chronic cardiac condition, in a general hospital for adults, equal in frequency of occurrence to chronic valvular disease of the heart, which, for want of a better term, may be called chronic myocarditis. By this term is meant cardiac insufficiency from myocardial disturbance without organic lesion of the heart valves. A very large proportion (366 out of 407) of these patients, on admission to the hospital, are over 40 years of age, and somewhat more are men than women. The heart is nearly always enlarged, and usually there is a systolic murmur at the apex; but whatever its intensity or transmission, it is very rare to find any thickening or distortion of the valve

PLATE XXX.

ANONYCHIA



flaps or chordæ tendineæ. Acute rheumatic fever and syphilis are both relatively uncommon in these cases, and neither plays any considerable part in the etiology. Chronic use of alcohol occurs in about one-third of the cases. High blood-pressure is often found, but is absent in more than half. Chronic nephritis is often present, as is hypertension; but in seventeen out of forty-one cases at necropsy, the kidneys showed no chronic nephritis. Coronary sclerosis is an important factor in only about half of the cases. Increase of interstitial connective tissue is the lesion most found in the heart muscle, but in numerous cases the heart muscle seems practically normal except for hypertrophy of the fibres. Electrocardiography often gives evidence of disturbed muscle function. About half the cases show auricular fibrillation or flutter or the distortion of the ventricular complex, indicating some disturbance in the conduction system; but in even advanced cases the electrocardiogram often shows no significant disturbance. Digitalis in the earlier breaks in compensation is a very efficient drug."

Clearly, as in rheumatic heart disease (q.v.) the problem is one of prevention, since cure is manifestly impossible. But, as Christian shows, we are imperfectly informed as to the etiology of this disease, and prevention is dependent upon a knowledge of causation. Three interesting contributions may be quoted in this connection. Vander Veer² describes a small group of cases in which operations upon gall-bladder or appendix were followed by symptoms of acute myocarditis and acute dilatation of the heart. All the patients were elderly, and although there were no cardiac symptoms prior to operation, possibly pre-existent cholecystitis had furnished a pool from which micro-organisms had found their way to the heart from time to time, laying the foundations of a myocardial degeneration. Vander Veer produces a little histological evidence in favour of this hypothesis, which would, if proved, furnish an explanation of the long-known association between gall-stones and chronic myocardial disease.

Krumbhaar,³ again, has attacked the problem of the relation between toxic goitre and myocardial disease, by means of systematic electrocardiographic study of cases of exophthalmic goitre. These show a progressive hypertrophy of the ventricles, right as often as left, with subsequent occasional development of various types of arrhythmia. There is some evidence to show that arrhythmia may be due in part to the direct effect of the thyroid toxin on the myocardium.

Lastly, there is Gunson's⁴ interesting essay which reminds us that the myocardium, self-governing though it be, has nevertheless its nervous connections, so that no study of myocardial disease is complete unless it embraces a consideration of the intrinsic nerve elements of the heart, its extrinsic nervous connections (central and sympathetic), and the pathological processes which are apt to attack these structures.

Therefore, in seeking for an explanation of myocardial lesions of doubtful origin, we must remember the possible effects, first of foci of infection, and next of endocrinic sources of intoxication, acting either upon the myocardium itself or upon its nervous connections, or both.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1918, i, 1909; ²*Ann. Surg.* 1917, ii, 295; ³*Amer. Jour. Med. Sci.* 1918, i, 175; ⁴*Lancet*, 1917, ii, 670.

NAILS, DISEASES OF.

E. Graham Little, M.D., F.R.C.P.

Anonychia.—Charteris¹ reports a case of partial or congenital absence of nails. The patient was a man, age 34 years (*Plate XXX*). It was noted that the nails of the thumbs, forefingers, and second fingers of both hands were entirely absent, and those of the ring fingers only developed as regards the ulnar half. The

little fingers had complete normal nails. A similar condition was present in the toes; the three inner toes lacked nails, the fourth toe had a rudimentary nail, while the little toe was furnished with a normal nail. The congenital absence of the nails was a hereditary defect in the patient's family. It could be traced back to his great-grandmother; and of his own four children, two show an exactly similar abnormality, while the other two have normal nails. In the preceding generation only the patient showed the family defects, his brothers and sisters having normal nails.

Onychomycosis.—Chalmers and Marshall² advise the following treatment for this very intractable condition. The diseased matter is removed as far as possible with scissors and sharp spoon, and the area dressed with lint soaked in this solution: **Pot. Iod.** 6 parts, **Liq. Potass.** (B.P.) 50 parts, distilled water 50 parts. The lint is covered with oil-silk and kept in position for fifteen minutes, when it is replaced with lint soaked in a lotion of 1 per cent **Chloride of Mercury** in equal parts of rectified spirit and water. This dressing is covered with oil-silk and retained all night, and the resulting inflammation is calmed down with "mild carbolic glycerin and alcohol lotion" (composition unspecified).

REFERENCES.—¹*Glasgow Med. Jour.* 1918, April, 207; ²*Jour. Trop. Med. and Hyg.* 1918, Oct. 1, 198.

NASAL ACCESSORY SINUSES.

P. Watson-Williams, M.D.

Bacteriology of Sinusitis.—Babcock¹ investigated 100 cases of sinusitis bacteriologically, and his research was enhanced in value by taking smears of the muco-pus to give an idea of the cytology of the secretions. In the majority of cases the secretion was caught in a sterile test-tube as it came from the nose while the sinus was being irrigated with sterile solution of salt and bicarbonate of soda, the nose in all cases being previously irrigated, while in a few cases the secretions were directly aspirated, and the ethmoid cultures were made 'directly.' The cytological findings showed nothing of great interest except that they roughly confirm Darling's findings that the presence of an excess of lymphocytes, especially when coupled with the presence of streptococci, renders the chance of cure without a radical operation distinctly less. The author admits the possibility of contamination in the specimens' passage through the nose, although, as 69 out of 119 cultures showed only one organism or no growth, the findings are probably fairly accurate and reliable. The cases were divided into acute or chronic, attacks lasting one month or less being grouped under the acute class; 53 were acute, 47 chronic. The bacteriological results were as follows:—

<i>Acute cases.</i>		<i>Chronic cases.</i>	
Pneumococcus occurred in	.. 32	Pneumococcus occurred in	.. 6
Streptococcus	.. 5	Streptococcus	.. 19
Staphylococcus	.. 30	Staphylococcus	.. 38
<i>Bacillus influenzae</i>	.. 4	<i>B. mucosus capsulatus</i>	.. 5
<i>B. faecalis</i>	.. 3	Diphtheroid bacillus	.. 4
<i>B. proteus</i>	.. 3		

In both groups there were a few other organisms occasionally. He found that the addition of a *Staphylococcus albus* to another organism in the culture seemed definitely to prolong the time required for treatment in the chronic cases.

The time required for treatment was as follows:—

Acute cases—

Pneumococcus group (22)	average time required for cure by lavage	(no operation required)	8½ days
Streptococcus group (5)			9 "
Staphylococcus group (22)		(1 case operated)	9 "
No-growth group (4)		(no operation required)	9 "

Chronic cases—

Pneumococcus group (6)	average time required		
	(operation required in 2)	55	days
Streptococcus group (10)	(8 cases operated on)	48	„
Staphylococcus group (21)	(9 cases operated on, 5 cured, 4 improved)	171	„

Attempts to determine the cause of foul odour reached no satisfactory conclusion in some cases.

TREATMENT.—Gleason² reports good results from **Suction** in the treatment of nasal accessory sinus suppuration, so that he has done no operations on sinuses except the antrum since MacWhinnie drew his attention to his own success with suction treatment. Any apparatus that will quickly produce a partial vacuum within the nose will answer a good purpose, and before use 2 per cent cocaine is applied to the parts about the openings of the sinuses from which it is desired to remove secretions, in order to remove any swelling that might obstruct these openings. Gleason usually follows the use of the pump by injection of 10 per cent **Argyrol** into these localities, with a long-nozzled hypodermic syringe. He advises the provision of a vacuum gauge and controller by which the exact amount of suction can be regulated; a negative pressure of much over twenty inches of mercury within the nose and accessory sinuses is often painful, and usually causes hæmorrhage by suction of blood from the inflamed mucosa. Two results are effected by the suction: (1) The sinus is more or less emptied of any contained mucopus (best accomplished by a remittent action of the apparatus); (2) Hyperæmia is induced (best by maintaining the suction steadily for ten or fifteen minutes).

Besides its value in treatment, suction may greatly aid diagnosis, by the aspiration of pus indicating the position of the cells from which the discharge is secreted. Further, it has seemed to prevent the formation of crusts in *ozæna*.

Coakley³ has found suction most unsatisfactory, and he states that he could not get out more than a modicum of the contained secretions, even with high degrees of suction, and subsequent lavages had washed out more than the suction extracted. He had tried suction often, and had ceased to use it; in some cases it caused swelling and œdema and did positive harm.

Nasal Sinusitis in Infants and Children.—Skillern,⁴ writing on the diagnosis and treatment of sinusitis in infants, emphasizes the acute character of the infection of the sinus labyrinth in infants, so that not only the mucosa, but the soft, spongy underlying bone—and hence the entire side of the nose and often the face—is affected, the abscess always showing a predilection to point and rupture externally either above or below the orbit. Further, as the ethmoidal labyrinth is proportionately well developed, the maxillary antra being still very small, and the frontal and sphenoidal sinuses practically absent, the infection is essentially an ethmoiditis which spreads to the other tissues, while sinusitis, properly speaking, does not exist in infants. Treatment consists in thorough **Curetting** of the ethmoid cells and antrum, if seen early enough. In children over five years of age, the affection is more prone to resemble chronic sinusitis in adults, though in acute cases the first indication is often slight swelling and redness to the median side of one eye, with a purulent discharge from that side of the nose. Sinusitis in children, however, does not always manifest itself first externally; it may simulate that of the adult by appearing as the continuation of a chronic cold and vague headaches, with general symptoms of malaise and with considerable purulent discharge from that side. More often the specialist does not see the patient till a later stage, when complications such as swollen eyelid with imminent rupture, or even the more serious orbital or cerebral complications, threaten or are actually present.

The author commends the value of the nasal endoscope and of the Röntgen ray in the diagnosis of the condition. In the beginning of an attack, purgation by Calomel in small doses, and the use of **Physiological Sodium Chloride Solution** douchings are most useful, and autogenous **Vaccines** are also of great service. In later cases surgical methods must be employed, viz., exenteration of the diseased ethmoid cells and maxillary antrum, with subsequent applications of **Organic Silver Compound** and administration of **Vaccines**. But the Caldwell-Luc or any similar operation through the canine fossa should never be resorted to on account of the destruction of the teeth germs that would follow.

Byfield,⁵ in a contribution on the systemic manifestations of chronic nasal sinus infection in childhood, refers to a case of chronic deforming arthritis in a child in whom the removal of tonsils and adenoids and treatment of the teeth did not control the progress of the disease; and his conviction was that with the irregular, even if slight, temperature, and with the persisting tenderness of the joints, infection must still be present. All other possible sources of infection having been apparently excluded, the nose as the possible source was considered. But intranasal puncture of the antra, following Röntgen-ray examination, yielded negative results, until a more radical antromeatomeal operation was performed later, with the finding of streptococci in the curettings of spongy granulation tissue from the antra. This was treated, with distinct subsidence of the clinical manifestations, and the child, with appropriate treatment, then became as nearly normal as could be expected, the progress of the disease was arrested absolutely, and the pain on movement of the joints entirely disappeared. Other cases associated with cyclical vomiting, poisoning of the sensory or trophic nerves leading to changes in the cornea, weakness, and muscular wasting, are referred to, also cases of chronic cough, nephritis, pyelitis, etc. Byfield considers that infection of the accessory nasal sinuses in children is more frequent than has been suspected hitherto. The treatment should be conservative and expectant, unless the trouble persists and continues to affect the patient's health unfavourably, and then surgery is indicated.

Intranasal Drainage of the Frontal Sinus.—Ingals⁶ and Freer agree that even if pathological changes in the mucosa of the sinus do exist, they are capable of disappearance under the influence of good drainage and ventilation, unless there be present caries of the bone or large polypi. The furor for extensive mutilating operations on the frontal sinus has had its day, because a suppurating cavity properly drained will usually heal if meddlesome surgery is avoided. Ingals holds that his operation can readily be performed by any properly-equipped laryngologist, and will prove effective in 95 per cent of suitable cases. In a pansinusitis, however, involving the ethmoid and sphenoidal sinuses, it cannot be sufficient. The essential instruments for Ingals' operation are: (1) Fine bent steel probes that are introduced, with the aid of a removable handle, through the nasofrontal duct into the frontal sinus; (2) A perforated burr that is run in over this probe to make a drainage canal of adequate size; and (3) A spring gold self-retaining tube to maintain the lumen of the canal until it has become covered with mucous membrane. The technique is as follows:—

In all cases the anterior third of the middle turbinated body should be removed before the operation. A silver cannula is attached to a 2-dr. syringe and passed as far as possible into the nasofrontal duct. To avoid pain and to remove swelling, the syringe is charged with 10 per cent cocaine in 1-4000 of epinephrin; as the cannula is introduced, about 1 min. of this solution is forced through it, every two minutes, on three or four occasions. Then Ingals employs his steel probes, and alters the curve as indicated by the direction

the silver cannula has taken. In order to avoid all danger, frontal and lateral skiagrams should be taken with the probe *in situ*. The frontal sinus itself is anesthetized by injecting about a drachm of 5 per cent cocaine in 1-4000 of epinephrin. The probe is introduced and its handle removed. The shank of the burr is then attached to the chuck of the dental engine, and the perforated burr with the spiral metal tube over its shank is slipped over the probe and pressed up to the roof of the naris. The current is then turned on, slight pressure is made, and in a second or two the frontal sinus has been opened. Ingals usually passes the burr up and down a couple of times. When the burr has been removed he passes in the bent tube packer, through which is introduced the end of a yard of gauze (half an inch wide), about a foot of which has been saturated with a liquid formed by rubbing together equal parts of Camphor and Carbolic Acid. This is pushed on into the frontal sinus and allowed to remain about five minutes. The packer tube is then drawn down about half an inch. The spring ends of the gold tube are pressed together by winding an elastic band around them, and slipped into a No. 2 gelatin capsule. The spiral tube is now placed over the applicator, and the gold tube is slipped on its distal end. Thus the gold tube is easily introduced, and the spiral tube is pushed up to hold it while the applicator is withdrawn. The small steel probe is then introduced once more, to punch a hole in or push off the gelatin capsule, which will dissolve in three or four minutes. The gold springs at once spread out and hold the drainage tube in position. The patient can wash out the frontal sinus as often as desired, without pain, with a metal Eustachian catheter bent to the same form as the applicator. The mucous membrane from the frontal sinus, and from the surrounding cells, soon spreads outside the gold tube, and forms a complete mucous covering, thus leaving a canal 6 mm. in diameter that cannot close. The drainage tube should be left in for three or four months.

R. Foster Moore, F.R.C.S.

Loss of Sight from Posterior Accessory Sinus Disease.—In a good article in which the relations of sphenoidal and posterior ethmoidal disease to affections of the optic nerve are considered, Leon E. White⁷ gives an interesting abstract of many of the reported cases of the condition. He reviews the work of different investigators as to the relation of the optic nerve to the accessory sinuses, and defines the points which suggest that a case of retrobulbar neuritis is due to sinus disease. Three cases are then reported in some detail as regards the history, nasal examination, eye examination, and x-ray appearances, with charts of the visual fields for colours. From a study of these cases, White comes to the following conclusions:—

Cases of retrobulbar neuritis can be divided into three classes: (1) Acute, following a coryza. Pressure of the secretions in the sinuses, and swelling from inflammation in the mucosa, cause constriction of the optic nerve and ophthalmic artery. (2) Chronic, with little pain, where an empyema of one or more sinuses is causing either pressure on, or atoxæmia of, the nerve. (3) Cases where, on opening the sinuses, hyperplastic changes are taking place, a periostitis of the sinus extending to the optic nerve and there producing a perineuritis. The enlargement of the blind spot is a marked sign. The prognosis is on the whole favourable. If pus is present under pressure, strangulating the nerve and artery, it must be evacuated. In cases in which there is only a thickened mucosa, and no obstruction to the outlet of the sinuses, if recovery does not occur within two or three days, the front wall of the sphenoidal sinus should be removed; if relief does not follow, the posterior ethmoidal cells should be opened. A complete ethmoid exenteration is rarely necessary.

Acute Anterior Ethmoiditis in Young Subjects.—Sydney Stephenson⁸ deals

with a group of cases which are usually diagnosed simply as orbital cellulitis without regard to the immediate underlying cause, which the author believes in many cases is due to an acute inflammation of the anterior ethmoidal cells or the bones in this vicinity. He gives details of ten cases of his own. In such cases an incision down to the bone at the inner angle of the orbit is recommended, from the root of the nose to the inner end of the eyebrow; a small raspatory is then made to raise up the periosteum over the anterior ethmoidal region, and pus is usually found here.

REFERENCES.—¹*Laryngoscope*, 1918, July, 527; ²*Ibid.* Jan., 1; ³*Ibid.* July, 562; ⁴*Jour. Amer. Med. Assoc.* 1917, ii, 895; ⁵*Ibid.* 1918, ii, 511; ⁶*Ann. Otol. Rhinol. and Larungol.* 1917, Sept., 656; ⁷*Boston Med. and Surg. Jour.* 1917, i, 891; ⁸*Brit. Jour. Ophth.* 1918, Aug., 416.

NASAL SEPTUM. (See NOSE.)

NASOPHARYNX AND PHARYNX, AFFECTIONS OF.

P. Watson-Williams, M.D.

Hairy or Dermoid Polypi of the Pharynx and Nasopharynx.—Brown Kelly¹ records the case of a female infant, age six weeks, who was brought to the hospital on account of the frequent protrusion from the mouth of a long tongue-like growth which hung out until pushed in again by the mother. This was first noticed when the baby was a week old. It was ejected after drinking, or without any apparent cause. The growth was found to hang by a fine pedicle coming from the left side of the nasopharynx; the exact site of origin could not be determined. The pedicle was severed as close to the attachment as possible by a fine snare passed up into the nasopharynx; there was no noticeable bleeding. After removal the infant breathed and swallowed better. The growth had an elongated club shape, and was slightly over 2 in. long, and $\frac{1}{2}$ in. in diameter at its thickest part, and covered with skin furnished with numerous very fine short hairs. The external layer consisted of stratified squamous epithelium, with in-dippings of a few hair follicles. The underlying connective tissue was of a loose rudimentary character, and contained minute glands. The central and greater part of the polypus was composed of tissue closely resembling fat. There are 50 cases recorded up to the present time.

In a few instances the baby was born with the growth protruding from the mouth. In others, it was of such a size or so situated as to cause partial asphyxiation and demand immediate removal. Dyspnoea, attacks of suffocation, difficulty in suckling and swallowing, and vomiting led to the inspection of the throat, with the consequent discovery of the tumour. In a patient of Jewett's the growth seemed to afford the child much pleasure, as it sucked it diligently, while a child under Eves' care swallowed with difficulty several times, whereupon the growth disappeared into the œsophagus. There is no recorded instance of death having been caused by the tumour. Five-sixths of the cases recorded were in females. The seat of origin is mentioned in 43 cases, in 25 of which it was in the nasopharynx. Of 18 originating in the pharynx, 7 sprang from the tonsillar region. The growth is club- or pear-shaped, is usually pedunculated, and is of fleshy consistence. The colour, as a rule, is greyish or white, like that of a well-cared-for skin. In some cases, the proximal part of the pedicle is covered with mucous membrane.

Hairy polypi are covered with ordinary skin, more or less abundantly furnished with fine downy hair, sebaceous glands, sweat glands, and occasionally plain muscle fibres. The bulk of the tumour consists of fat, filling the meshes of a fibrous connective-tissue matrix; striated muscle or cartilage bone may be present. Mucous glands and salivary-gland tissue have also been reported. The structure indicates an epiblastic origin. The site is close to

where the epiblast of the stomodæum fuses with the anterior end of the foregut. It is significant that a number of the tumours were planted in the tonsillar region, which corresponds to the second branchial cleft.

The Fossa of Rosenmüller.—Yankauer,² from very numerous observations, has shown that the fossa, in addition to being a source of aural symptoms, e.g., tinnitus, Eustachian catarrh, etc., also has a bearing on nasal symptoms and affections, and may be the source of reflex cough, etc. He emphasizes the important bearing of the anatomical fact that the fossa of Rosenmüller is the only part of the nasopharynx which is not supported by muscular fibres, so that muscular contraction, e.g., in swallowing or gagging, cannot empty the fossa of secretion. Now, when one recalls the salpingo-nasal fold which passes upwards from the tubal eminence to the vault containing the accessory bundle of muscle fibres belonging to the superior constrictor, one realizes how adhesions that may have formed between adenoid growths and the posterior tip of the Eustachian eminence cause a pocket to form in which secretions may be lodged. Yankauer refers to one such case in which foul-smelling breath and bad taste could not be relieved, and was considered an example of parosmia of nervous origin, until Yankauer severed adhesions which had thus closed the fossa on both sides; while in another patient such a fossa had so locked up secretions containing *Streptococcus viridans* that toxic absorption therefrom appeared to have been the cause of chronic rheumatism.

Yankauer reaches the following conclusions: (1) Diseased conditions of the fossa of Rosenmüller may give rise to a degree of nasal obstruction equally as great as that caused by hypertrophied adenoids; and persistent nasal obstruction after the removal of large masses of adenoids may be explained thereby. (2) Secretion pouring over the tip of the Eustachian eminence, when in front of the salpingo-nasal fold, is indicative of disease in the posterior group of nasal accessory sinuses. Secretion in the fossa of Rosenmüller behind the salpingo-nasal fold, particularly when associated with adhesions in this region, may cause a clinical picture closely resembling disease of the accessory sinuses, even though the latter are entirely free from pathological changes. (3) It is not impossible that a fossa whose drainage is obstructed may be the focus of a general systemic infection. (4) Reflex nasal and laryngeal neuroses may have their origin in this region.

Disinfection of Nose and Throat by Chlorcosane Solution (Dakin-Dunham).—Bryson-Delavan³ has used *Chlorcosane* in 2 per cent solution with marked success. This is an oil obtained by chlorinization of paraffin wax by dichloramine-T. For tonsil disinfection, a thorough cleansing of the crypts should be followed by *Adrenalin* applied to the crypts, and then the chlorcosane sprayed in. For nasal disinfection, he similarly recommends first cleaning of the mucosa, then applying adrenalin to open up the passages, and finally the chlorcosane should be sprayed in; a similar application of adrenalin should precede applying chlorcosane to the nasopharynx. Used in the strength of 2 per cent, chlorcosane is seldom irritating; but when this causes smarting or burning, he reduces the percentage of dichloramine-T to as low as 1 or even $\frac{1}{2}$ per cent. The disinfection of diphtheria carriers and of meningococcal infection may be obtained by this solution.

REFERENCES.—¹*Jour. Laryngol. Rhinol. and Otol.* 1918, March, 65; ²*Laryngoscope*, 1917, Dec., 861; ³*Med. Rec.* 1918, ii, 89.

NEEDLES IN THE HAND, REMOVAL OF. W. I. de C. Wheeler, F.R.C.S.I.

Bulkley¹ analyzes the records of seventy-two hospital cases, and finds that in only 40 per cent was the needle discovered at the first attempt. He himself has used an instrument similar to the Mackenzie-Davidson telephone probe.

Contact is readily obtained between the needle and the instrument. Difficulty in finding the foreign body was only experienced in two out of thirty-three cases, and the writer urges that a method capable of reducing primary operative failure in the removal of needles from 53 per cent to 3 per cent is worthy of trial.

REFERENCE.—¹*Ann. Surg.* 1917, July, 19.

NEPHRITIS. (See also KIDNEY, DISEASES OF; RENAL FUNCTION TESTS).

John D. Comrie, M.D., F.R.C.P.

ETIOLOGY.—That a form of inflammation of the kidneys often arises in the course of some general septicæmic condition is well known, and the comparative importance of this cause is urged by Ophüls¹ in a paper which deals with the matter from an experimental point of view, and also records numbers of cases confirmed by post-mortem examination. He concludes that these cases are usually of the type of glomerulo-nephritis, and that as the lesions are of a distinctly inflammatory type, this form may be spoken of as true nephritis. He has found it in acute, subacute, and chronic stages, and has produced precisely similar lesions in animals by the injection into the blood-stream of organisms of varying virulence. The majority of cases in man are due to streptococci, but other bacteria may cause similar lesions in the kidneys as elsewhere. Many of the chronic cases are caused by a form of chronic tonsillitis in which diplostreptococci are the infective agents.

Williams² considers that one of the most important steps in treatment is to begin by looking for and removing foci of septic infection in the tonsils, teeth, or diseased prostate, for example. After that rest, a low, simple, general diet, and the avoidance of chemical irritants like spices, mineral acids, alcohol, animal extracts, and of foods containing bacteria and bacterial products, are important. In cases associated with uræmia he is accustomed to give the patient for a time a limited diet of Milk only, combined with Lime-water or with Calcium Carbonate or Lactate, in $\frac{1}{2}$ -grm. doses several times daily. Howard,³ regarding nephritis from a purely clinical point of view, considers that in addition to true nephritis one should recognize two simpler conditions of similar symptoms. In one there is a pure failure of the kidney function with œdema but without hypertension or nitrogen retention, which is curable by rest and a Dry Diet; there is also a condition of simple hypertension with its attendant dangers.

SYMPTOMS.—The rate of excretion of the three chief nitrogenous waste products—uric acid, urea, and creatinin—in nephritis has been studied by Watanabe,⁴ who found that with a lowering of the activity of the kidneys the uric-acid excretion is the first to suffer, while as the disease of the kidneys advances it is found quite uniformly that the creatinin secretion is the last to become markedly altered.

The condition of the blood-pressure in amyloid disease of the kidney has been investigated by Hirose,⁵ who examined a series of fifty-nine cases of this condition. In all there was chronic nephritis as well as amyloid disease, but nevertheless in all but one case the blood-pressure was found to be normal or below normal, although cardiac hypertrophy was noted in several.

The conditions responsible for dyspnoea in Bright's disease are summed up by Bernheim⁶ as hydrothorax and pulmonary œdema, asystole occurring in cardiac hypertrophy, and asthma of reflex origin due to aortic or coronary disease. The Cheyne-Stokes breathing, which frequently occurs, is attributed by him not to uræmic influence on the breathing centres but to ischæmia consequent on arterial disease or other mechanical intracranial effect.

The various stages of azotæmia in Bright's disease, with their prognostic

import, are given in a paper by Widal, Weill, and Valéry-Radot⁷ as the result of prolonged observation of such cases. The first or premonitory stage is that in which there is constant elevation of the blood-nitrogen without increase of urea in the blood; next follows an embarrassment of the kidney secretory function, from which, however, recovery may still take place, the blood-nitrogen being between .5 and 1 grm.; should the amount rise permanently above 1 grm., the prognosis becomes very grave; and the occurrence of 2 grms. indicates that death is very near, the blood-urea by this time rising very much.

TREATMENT.—Williams⁸ considers that so far as medicines go, **Salts of Calcium and of Iron**, both of which favour elimination of phosphates, are the most useful in this disease. A method for the alleviation of œdema by means of dieting in chronic parenchymatous nephritis is outlined by Epstein.^{9 10} Since the blood in these cases shows a marked decrease in protein and an increase in lipoids, the indications are to increase the protein content of the blood and thus help it regain its normal osmotic power, and to remove or cause the reabsorption by the tissues of the excessive lipoids. **Massive Infusion of Healthy Blood** is suggested as a temporary help, though the continuation of the albuminuria, causing a constant loss of blood-protein, prevents its effect from being permanent. The articles used for **Protein Diet** are—lean veal, lean ham, whites of eggs, oysters, gelatin, Lima beans, lentils, split peas, green peas, mushrooms, rice, oatmeal, bananas, skimmed milk, tea and cocoa; and these supply proteins up to 120 to 240 grms. daily. Only so much **Salt** is allowed as is necessary to make the food palatable. **Kidney Organotherapy** is favourably mentioned by Anders¹¹—10 to 15 5-gr. tablets daily; and its action is explained as being due to a stimulating effect on the kidney functions brought about by the presence of an adrenal principle in organic combination. In the treatment of nephritis, Blumgarten,¹² like other recent writers, lays more stress upon maintenance of the nutrition than upon attaining a scientific balance of elimination through diminishing the protein intake. He recommends the use in œdema of **Hypertonic Salt and Glucose** solutions; and for uræmia he thinks that **Venesection** followed by **Transfusion of Blood** should be tried more frequently. Christian¹³ concludes that in uncomplicated nephritis diuretics are either useless or actually harmful, but **Digitalis** and **Caffeine**, which are so largely employed, probably do more good by their circulatory effects than they do by their influence upon the kidneys.

WAR NEPHRITIS.

ETIOLOGY.—The chief factor in the causation of nephritis among soldiers, who are undoubtedly much more frequently affected by this disease than are men of similar condition at home, has been much discussed. Haydn Brown¹⁴ is inclined to attribute the greatest share in its production to exposure. Carey Coombs¹⁵ considers that fatigue seems more likely to play a leading part than does exposure; and he points out, what everyone who has had much experience of war nephritis has noticed, that the onset of the disease is commonly connected with some "infective disease, such as influenza, trench fever, gastro-enteritis, boils, tonsillitis, and so on." The Committee on War Nephritis working in France, in their Report,¹⁶ found that the first marked incidence of nephritis among soldiers in that country took place in the spring and early summer of 1915, though after that time most of the cases occurred in the winter, the temperature of the air varying inversely with the rate of incidence of the disease. This Committee also found that the symptoms tended to appear insidiously, the first indication in those doing heavy manual work being shortness of breath, and in those at sedentary occupations being

headache. The attempt to discover a relationship between previously existing albuminuria and the occurrence of war nephritis was entirely negative, as was also the search for a causal organism in the urine, blood, throat, and faeces. Tytler and Kyle,¹⁷ from the clinical study of 150 cases at a casualty clearing station in 1916-17, doubted whether the kidney lesion was really at the root of the condition, and suggested that the pulmonary affection is the most important, as shown by the marked respiratory symptoms which occur and by the peculiar post-mortem changes found in the lungs. The latter consist chiefly in catarrhal exudation into the small bronchial tubes and alveoli, with œdema, and the occurrence of thrombi in the small vessels, the whole process being of an inflammatory nature. Keith and Thomson¹⁸ made a careful study in a smaller series comprising 33 cases, directing their attention mainly to the urinary condition. Although in their fatal cases they do not appear to have made any special observations on the lungs beyond the fact that these organs were "voluminous, markedly congested, and œdematous," they state quite positively that in none of the cases did they find "any histological evidence pointing to a previous renal lesion." Ceconi¹⁹ found a history of recent tonsillitis, acute articular rheumatism, severe chilling, pyorrhœa, otitis, or boils, in about one-half of his cases, but in fully 50 per cent no cause whatever preceding the kidney manifestations could be discovered. He is inclined to think that this type of nephritis constitutes a hitherto undescribed form of infective disease in which the blood-vessels bear the brunt of the attack and develop lesions from which complete retrogression with recovery is liable to take place. Peters and Stevens,²⁰ in a series of 155 cases, found that about one-third had chronic cardiac or renal disease with a recurrence of symptoms, and they noted, as several others have done, the fairly frequent occurrence of hæmorrhagic cystitis accompanying the nephritis. Dunn and McNee²¹ were among the earliest observers to notice that in the kidneys the main change is an inflammatory and proliferative condition within the capillaries of the glomerular tufts, and they also noted the constant œdema of the lungs. In the Belgian Army, as among the French and British troops, nephritis has been common, and Moret²² attributes its causation especially to fatigue and cold, not regarding the condition as in any way essentially different from the nephritis of civil life. McWalter²³ has observed the same symptoms among men of the Mediterranean Expeditionary Force who have never been in trenches, and he attributes the cause in these cases to exhaustion and chill. Oliver²⁴ states several facts which lend support to the theory that exposure is a very important factor in the cause of war nephritis, and he also adduces, as a fact which may bear on its production, the occurrence of lead in the urine, as he found it in something like 43 per cent of the urines of soldiers treated in the Northumberland War Hospital.

Eye changes were found frequently by Kirk²⁵ in this disorder. These consisted of œdema with patches of exudate in the retina, but in the great majority complete resolution took place. The phenolsulphonephthalein function test has been used for estimating the severity of the affection by Auld,²⁶ who concludes that if, at the end of four months, the phthalein excretion reaches 40 per cent or over, ultimate recovery is the rule. Dyke²⁷ has followed up 50 cases for twelve months after the original onset of the disease; he found only one death (from subsequent scarlatina) in the series, while 29 (60 per cent) made a return to complete health.

TREATMENT.—Coombs²⁸ outlines the treatment followed in 160 cases of war nephritis. The diet was first—unless the case was a very mild one—milk, tea, rice-milk, bread and butter, milk pudding, cocoa. In the course of a few days, as the symptoms improved, fish (6 to 8 oz. per day) and potatoes (about $\frac{1}{2}$ lb.

per day) were added to this. Hot-air baths were used when much œdema was present. **Saline Purges** were usually given for a day or two after admission. The only diuretic which seemed to help the output of urine was **Tartrate of Potash**. **Atropine Sulphate** was used in one case where acute œdema of the lungs appeared to threaten life, and was very effective. **Venesection** seemed to be the best line of treatment in uræmia.

The disposal of nephritis cases in the German army is interesting.²⁰ Mild cases were to be discharged from hospital fourteen days after apparently complete recovery, then to have two months of inside garrison duty, followed by two or three months of outside garrison duty. If after this period no untoward symptoms arose, the man might be returned to active service. If after six months there were only a small amount of albuminuria and very few blood-corpuscles, light work or inside garrison duty might be considered. Harmsen,³⁰ in the experience of 115 cases treated in a field hospital, had a mortality of 4·3 per cent. Bergemann³¹ found eye changes in 22 per cent of all cases. Schlayer²² found that **Withdrawal of Salt** was one of the most useful means for combating œdema, and that on evidence of uræmia appearing, **Venesection** with a loss of 500 or 600 c.c. of blood was the best treatment.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1917, Oct., 1223; ²*N. Y. Med. Jour.* 1918, July, 133; ³*Ibid.* 1918, Aug., 313; ⁴*Amer. Jour. Med. Sci.* 1917, July, 76; ⁵*Johns Hop. Hosp. Bull.* 1918, Aug., 191; ⁶*Med. Press.* 1918, Feb., 163; ⁷*Presse Méd.* 1918, May, 261; ⁸*Med. Rec.* 1917, Oct., 624; ⁹*Amer. Jour. Med. Sci.* 1917, Nov., 638; ¹⁰*Ther. Gaz.* 1918, Mar., 180; ¹¹*Med. Rec.* 1917, Aug., 311; ¹²*N. Y. Med. Jour.* 1918, Aug., 316; ¹³*Ther. Gaz.* 1918, Feb., 95; ¹⁴*Med. Press.* 1918, May, 352; ¹⁵*Lancet*, 1918, April, 495; ¹⁶*Ibid.* 1918, Sept., 362; ¹⁷*Quart. Jour. Med.* 1918, Jan., 112; ¹⁸*Ibid.* 1918, April, 229; ¹⁹*Riforma Medica*, 1918, Jan., No. 4 (abst. *Jour. Amer. Med. Assoc.* 1918, Mar., 965); ²⁰*Jour. Amer. Med. Assoc.* 1918, June, 1760; ²¹*Brit. Med. Jour.* 1917, Dec., 745; ²²*Arch. Méd. Belges*, 1917, Nov., 1033; ²³*Med. Press and Circ.* 1917, Dec., 492; ²⁴*Brit. Med. Jour.* 1917, Dec., 755; ²⁵*Ibid.* 1918, Jan., 7; ²⁶*Ibid.* 1917, Sept., 414; ²⁷*Lancet*, 1918, Sept., 321; ²⁸*Ibid.* 1918, April, 495; ²⁹*Veröffentl. a.d. Geb. d. Mil. San. Wes.* 1918, sec. 70 (abst. *Daily Rev. of Foreign Press*, 1918, Aug., 258); ³⁰*Deut. med. Woch.* 1918, 728, in *ibid.*; ³¹*Ibid.* 1918, 520; ³²*Med. Klin.* 1918, 433, in *ibid.*

NERVES, PERIPHERAL, SURGERY OF. *E. W. Hey Groves, M.S., F.R.C.S.* *Cecil A. Joll, M.S., F.R.C.S.*

The very high incidence of peripheral nerve lesions among the wounded has provided material for the study of a vast number of cases, embracing all degrees and combinations of nerve injury. As a natural consequence there has been a great stimulus to the study of the many problems which have a bearing on the diagnosis and treatment of these lesions. In pre-war days our knowledge, though not inconsiderable, thanks to the work of Head and Rivers and of Trotter, was lacking in many essential details, and in some directions, as we have since established, our teaching was faulty. This great mass of clinical material has enabled a large band of workers to fill in many gaps in our knowledge, which, while in many cases merely confirming views long accepted, has in others obliged us to modify or even wholly reject them. To help in the solution of some of the points, the anatomist has studied anew the details of muscle innervation, the finer points in the internal topography of the nerve trunks, and the important question of the variations in the formation of nerve plexuses and trunks as well. Again, the experimental physiologist has been called in to solve the question, so long debated, as to the exact mode of regeneration of nerves, the vexed question of nerve grafting, and the value, if any, of nerve anastomosis. Not all of these problems have been solved, but the advance in our knowledge has been very great, and, while differences of opinion are still numerous, yet in some directions virtual unanimity has been reached on what were formerly obscure points.

ANATOMY.

Borchardt and Wjasmensky¹ emphasize the point that the median supplies the whole of the flexor sublimis digitorum and that part of the profundus which goes to the index finger, and that it is this finger alone which cannot be flexed in complete median lesions. This important point has often been overlooked in the examination of patients after nerve suture, and unduly optimistic conclusions have been drawn because the patient could flex the middle finger, the deep flexor of which is supplied, partly at any rate, by the ulnar. (*Plate XXXI, Fig. A. See also Fig. B for characteristic sign of median paralysis.*)

As a corollary to this, Burrow and Carter² mention that the abductor indicis may be innervated through the median and not the ulnar. Borchardt and Wjasmensky, in their elaborate study of the median, were not able to confirm Stoffel's views as to the constancy of the 'fascicular topography' of this nerve, and they doubt the possibility of making accurate 'fascicular' suture. Barile³ agrees as to the variability of the internal arrangement of the nerve fibres in the nerve trunk; but Langley,¹⁷ who gives a full account of the present state of our knowledge of this subject, strongly urges the desirability of the separate suture of these nerve bundles in the operative treatment.

THE PHYSIOLOGY AND PATHOLOGY OF REGENERATION.

Several valuable papers have appeared dealing with experimental and pathological investigations of the mode of healing of nerves, and the closely related questions dealing with nerve grafting and nerve anastomosis.

Nageotti,³ in a well-illustrated paper, insists on the great importance of Schwann's sheath in the healing and regeneration of nerve fibres. He states that from the proximal end of the cut nerve, fine ill-defined nerve fibrils grow out, surrounded by Schwann's sheath, which forms a series of branching intercommunicating columns in which the nerve fibrils run; the latter are never found free in the surrounding connective tissue. In the distal end similar changes occur in Schwann's sheath, but in it are no nerve fibres. He concludes from these findings that healing occurs by the union of the two columns formed by Schwann's sheath, and by the growth of the fibrils from the upper column into the lower one, and the subsequent transformation of these into adult nerve fibres with a proper endoneurium. In this paper too he supports the value of autoplasmic grafts of large transverse section, but admits that they are difficult to get, and that therefore he has been led to use dead heteroplasmic grafts from the nerves of foetal calves, which he preserves in weak alcohol. He claims to have obtained perfect results by this method, bridging gaps as wide as 4 cm. in the sciatic nerve of dogs.

Cone,⁴ from a study of material obtained at a large series of operations, states that in sections cut from the proximal end of the nerve, new nerve fibrils were found in 100 per cent of the specimens; from the distal ends in 95 per cent; in the tissue between the ends of the nerve in 78 per cent; and in the surrounding tissue in 80 per cent. He shows also that nerve fibrils have a considerable power of penetration of such material as fascia lata used for nerve wrapping, and they can also creep along blood-vessels, round obstacles such as hairs, pieces of foreign material, clothing, etc. (*Plates XXXVI, XXXVII* show examples of the conditions referred to.

Ramon y Cajal^{6,7} has studied the question of nerve regeneration and of nerve grafting by his well-known histological methods. He concludes that neurotrophism—the guiding of the nerve fibril into its appropriate channel—depends on the vitality of the cells of Schwann. He concludes also that a

PLATE XXXI.
SURGERY OF NERVES

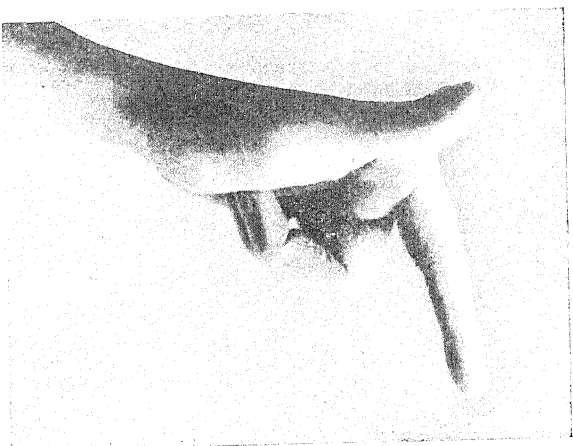


Fig. A.—Complete division of the median nerve. The interossei are able to flex the first phalanx, but flexion of the others is impossible. (In this case the middle finger is flexed, as a result of the action of the flexor profundus which is sometimes supplied by the ulnar.)

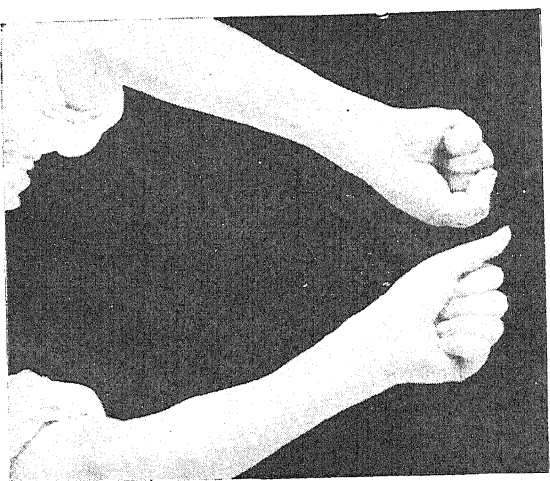


Fig. B.—Characteristic sign of median paralysis. On the left side the patient cannot bring the thumb in front of the middle finger as on the right side.

Photos XXXI-XXXV by permission from "Traité de Neurologie," Gauthier, Villard et Co.

PLATE XXXII.

SURGERY OF NERVES—continued

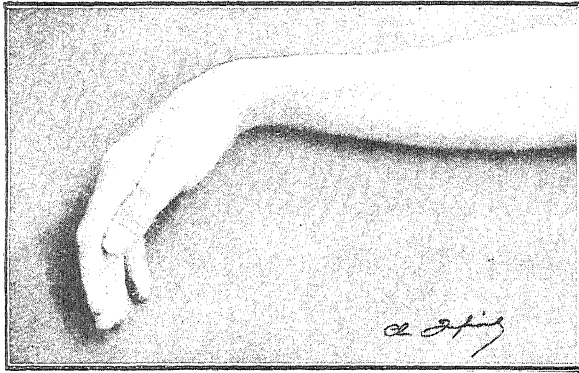


Fig. C.—Illustrates simple compression of the musculospiral. The paralysis is the same as in complete division of the nerve, but the tone of the muscles is retained to a slight extent and the hand droops less.

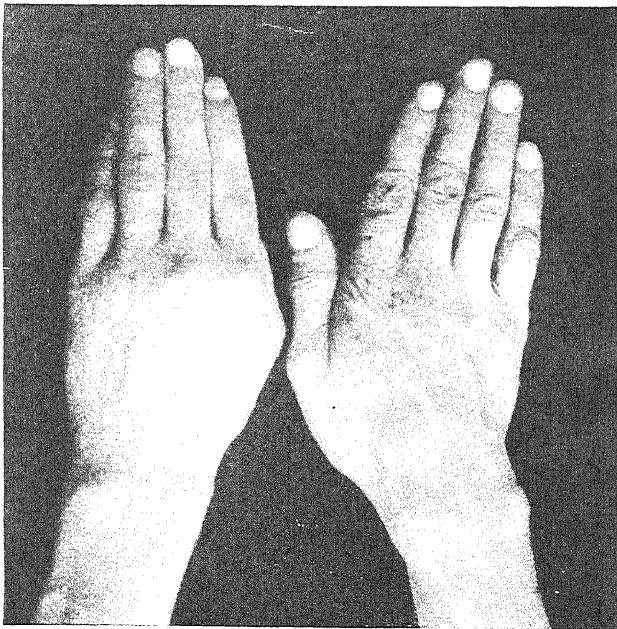


Fig. D.—Cutaneous disturbances in a case of nerve irritation (note the smoothness of the fingers of the left hand and the disappearance of the cutaneous folds).

PLATE XXXIII.

SURGERY OF NERVES—*continued*

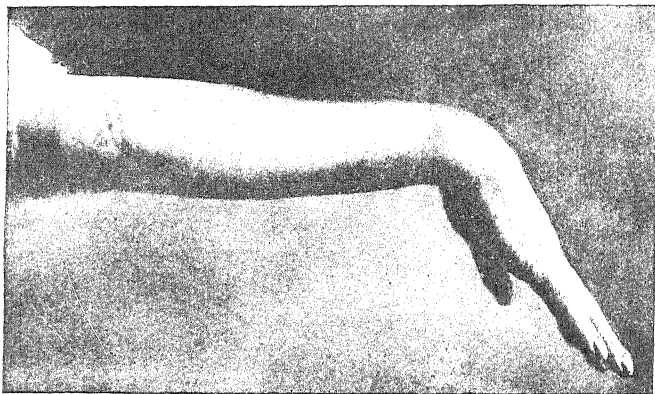


Fig. E.—Illustrates 'nerve-irritation' type. The droop of the hand is not so pronounced as in complete interruption. The fingers are extended as a result of contraction of the extensors and adhesion of their tendons to the dorsal surface of the hand.

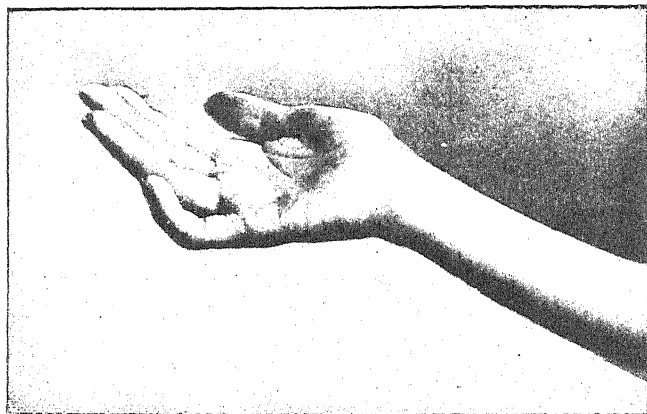


Fig. F.—Simple type of ulnar 'griffe' seen in complete section above epicondyle.
(Two months from date of wound.)

PLATE XXXIV.

SURGERY OF NERVES *continued*

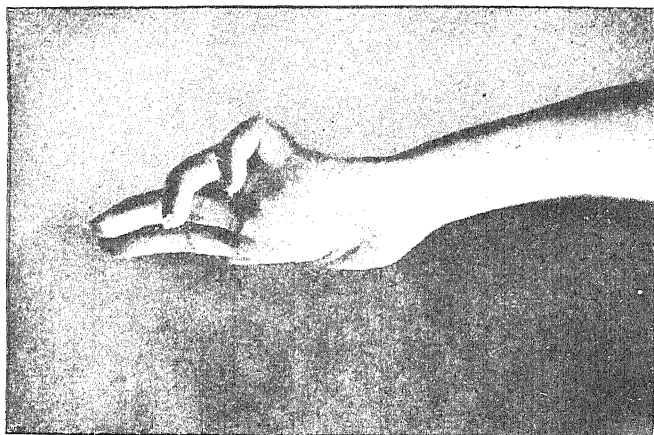


Fig. G.—Hyper-extension of last two fingers (as a result of hypotonia of interossei) in a case of prolonged ulnar paralysis.

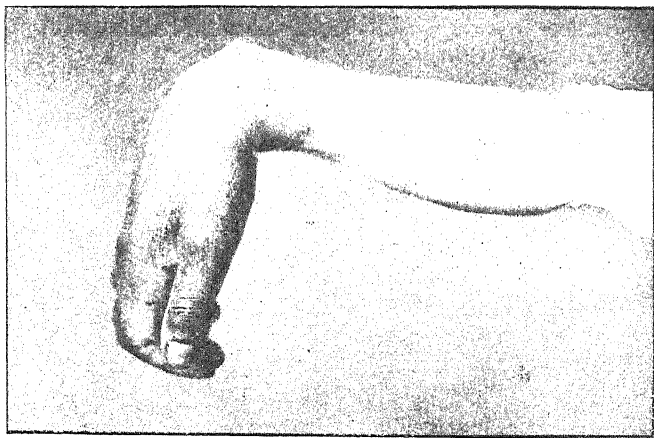


Fig. H.—Extreme hypotonia in case of complete musculospiral paralysis (nine months' interval since wound).

PLATE XXVI.
SURGERY OF NERVES: *continued*

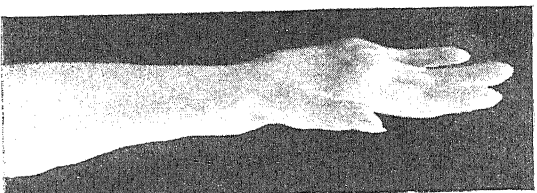


Fig. 1. Deformity of the median and ulnar "claw-hand" type.

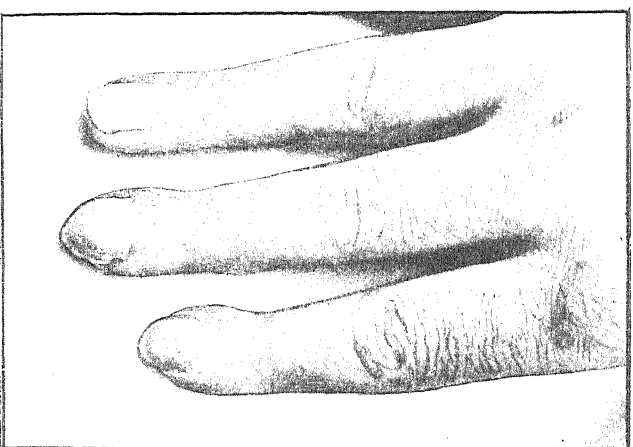


Fig. 2. Proximal of the median nerve, with incision of tendons, contract atrophy of the proximal phalanges, fibrous infiltration of the dermis and distal joints (compare index and middle finger with the comparatively unaffected thumb).

PLATE XXXVI.

THE REGENERATION OF NERVES

(SYDNEY M. CONE, U.S.A.)

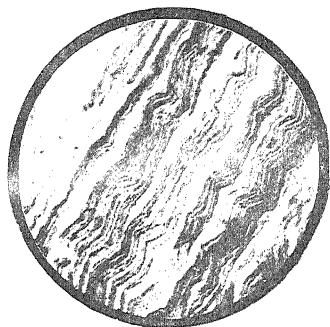


Fig. A.—Numerous young varicose spiral fibres in old fibres of nerve bundle. Proximal end. Four months' growth. There are 5 to 10 new tendrils in each original nerve fibre. ($\times 300$.)

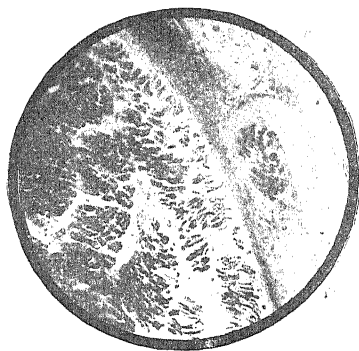


Fig. B.—New growth in old fibres and in thickened perineurium of distal segment of excised nerve. No adult fibres with conformation were seen under higher magnification. ($\times 300$.)

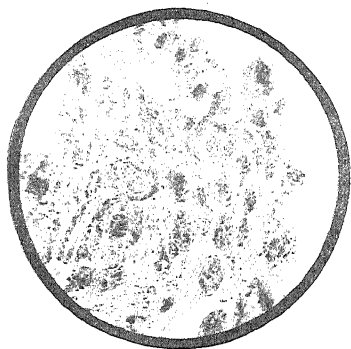


Fig. C.—Excised nerve; 6 cm. removed; section is from the firm fibrous portion near the middle. Fasciculi of good adult fibres. The fasciculi are more definitely circumscribed than usual. ($\times 300$.)



Fig. D.—Distal end of ulnar nerve. A piece from this was implanted into a guinea-pig. Discrete young varicose tendrils (black) in loose cellular connective tissue. ($\times 480$.)

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PLATE XXXVII.

THE REGENERATION OF NERVES--*continued*

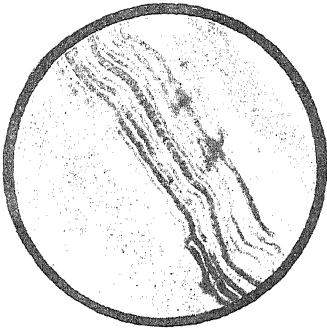


Fig. E.—Bundle of adult and young fibres in lumen of thrombosed vessel. The nuclei in the vessel walls are faintly outlined. ($\times 240$.)

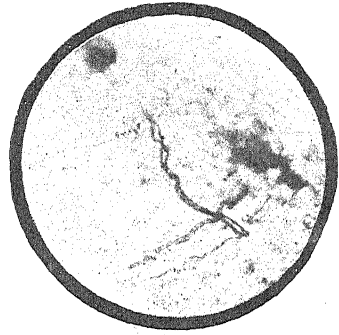


Fig. F.—Same as *Fig. E.* Young varicose fibres (2 to 4 μ) growing in walls of vein. They are spiral in form and run in various directions. ($\times 240$.)

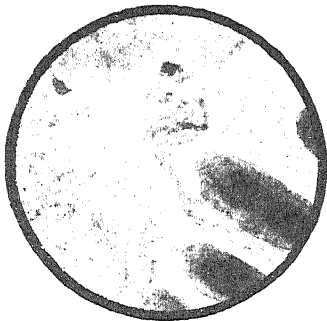


Fig. G.—Growth in guinea-pig (35 days). Young varicose fibres in spiral form growing about hair sacs. ($\times 60$.)

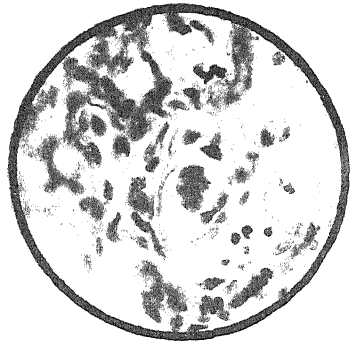


Fig. H.—Foreign body with a branching nerve tendril close to it. Other tendrils, near by, could not be brought into the same focus with the one photographed. ($\times 480$.)

fresh autoplasmic or homoplasmic graft exercises almost as great a neurotropic action as the normal peripheral end of the nerve, and he therefore advises the use of such grafts where the surgical conditions require the bridging of a gap. We shall see later that the bulk of clinical evidence is opposed to this conclusion. Cajal, however, unlike Nageotti, finds that heteroplasmic grafts have no neurotropic action.

EXAMINATION OF THE PATIENT.

Although there is little new to record under this heading, a good deal has been done to systematize the methods and to determine those which are most useful for routine examination, and which must be employed for difficult or obscure cases.

Burrow and Carter,⁸ in a very valuable paper, insist on the importance of examining the patient (and the affected part) under proper physical conditions, and they emphasize the utter unreliability of electrical and sensory tests if the limb is cold. They advocate the use of a paraffin bath at 40° C. in order to insure the correct temperature of the part and to give results which are comparable for purposes of accurate records. Souttar⁹ recommends the use of monthly charts of the sensory changes in order to obtain a satisfactory idea of the progress of the case both before and after operation.

Burrow and Carter use the following scheme for the examination of the patient :—

1. INSPECTION.—*Bones*.—(a) Position of wounds and scars; (b) Attitude of limb.

Joints.—Contractures.

Muscles.—(a) Atrophy—its distribution; (b) Tremor and fibrillation. Atrophy does not occur until some weeks after the injury.

Skin.—Trophic changes, ulcers, blebs, delayed shedding of epithelium, 'branny skin,' 'glossy skin,' etc.

Nails.—Colour, shape, striæ, brittleness, rate of growth, etc.

Hairs.—Hypertrichosis, absence, etc.

Vasomotor changes.—Distribution, degree, etc.

Joints and Muscles.—Limbs should be placed in a position so that weak muscles have not to act against gravity. Passive movement is first tested, and then voluntary power. It is well to remember here the numerous substituted movements which are possible, since they may confuse diagnosis and may cause us to draw flattering but erroneous conclusions as to the efficacy of our surgical methods. Rauchberg,¹ for instance, mentions that after total division of the musculospiral it may still be possible to get a feeble extension of the terminal phalanx of the thumb, not because there is any power in the extensors, but because the antagonist muscle—the flexor longus pollicis—relaxes, and the abductor pollicis, which has a slip of insertion into the common extensor tendon, can then act as a feeble extensor. Again, after division of the ulnar it may still be possible to adduct the hand, either because the injury was below the point at which the twig to the flexor carpi ulnaris is given off, or because of that muscle receiving a supply from the median through the anastomosing branch which the ulnar receives; or lastly, it may be due to the action of the extensor carpi ulnaris acting in conjunction with the flexor carpi radialis and the palmaris longus, the latter counteracting the extensor effect of the extensor carpi ulnaris. Abduction of the thumb is still possible after complete ulnar lesions, by the extensors of the thumb acting against the flexor longus pollicis, the latter also acting as an adductor and a flexor of the terminal phalanx. In other cases the adductor is supplied via anastomotic fibres from the median. After division of the median, the ring and little finger, and to a slight extent

the middle finger, may be flexed at the proximal interphalangeal joint, owing to the influence of the anastomotic fibres from the ulnar to the median nerve which supply the flexor sublimis. Hughes¹³ gives several other instances, and states quite rightly that many of them are merely indications that the details of muscle innervation tend to be forgotten, at any rate by those not actively engaged in anatomical teaching. Some, however, are due to our ignorance of the actions of single muscles. (*Plate XXXI, Fig. B* illustrates a valuable diagnostic sign in median paralysis.)

2. PALPATION.—*Scars*.—Presence of neuromata.

Nerves.—Slight pressure to detect paresthesiæ. The exact site at which this paresthesia is evoked by pressure on the nerve trunk distal to the injury, working from the distal towards the central end, should be specially noted, since it forms the basis of Tinel's sign,¹⁰ which several authors claim as a most

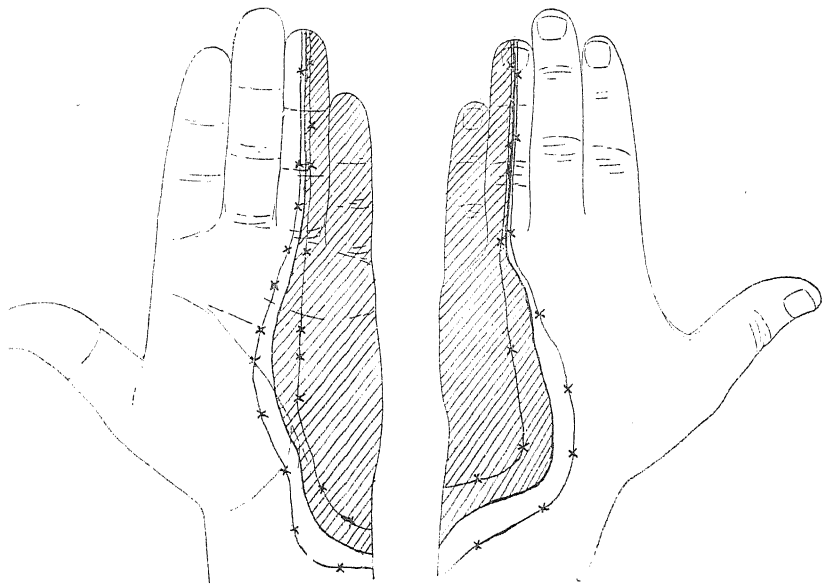


Fig. 96 A and B.—The hatched area shows the average loss to light touch in Burrow and Carter's series of complete lesions of the ulnar nerve above the wrist. The outer crossed line shows the larger area over which discriminating sensibility is lost. The inner crossed line corresponds to the points at which pin prick is first appreciated, but as a 'blunt' sensation.

valuable diagnostic and prognostic indicator; among these are Macdonald,¹¹ and Burrow and Carter.⁸ It is curious that Tinel's sign is based on the Wallerian view of the regeneration of nerves; yet a great deal of the recent research seems to support the teaching of the other school, which ascribes a very important rôle to the peripheral segment in the process.

3. PERCUSSION.—Direct percussion of muscle bellies and of tendons will sometimes reveal a slow contraction in muscle which subsequently is found to exhibit the reaction of degeneration.

4. SENSORY EXAMINATION.—It is most important in this examination to select methods which are exact, standardized, and capable of being compared with observations made on the same patient at other times, and also with those on other patients with similar lesions; and it is because this has been so often

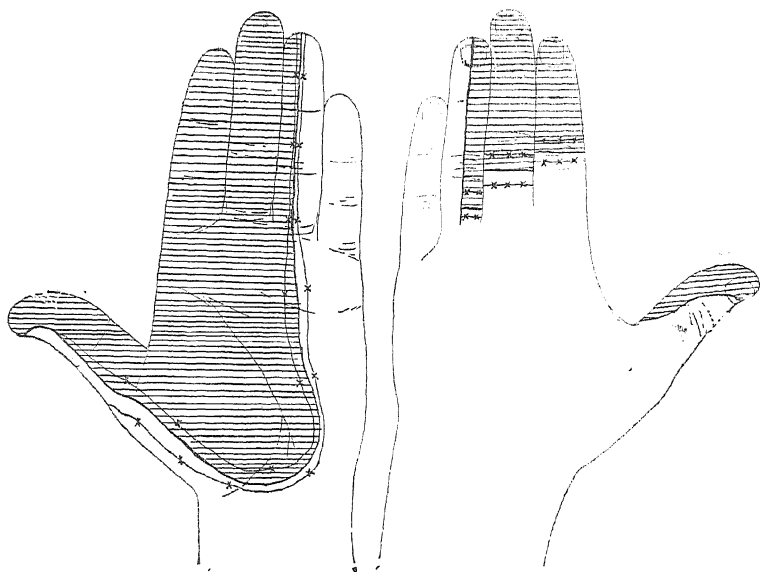


Fig. 97 A and B.—The same convention holds good for these diagrams as regards the skin area supplied by the median nerve.

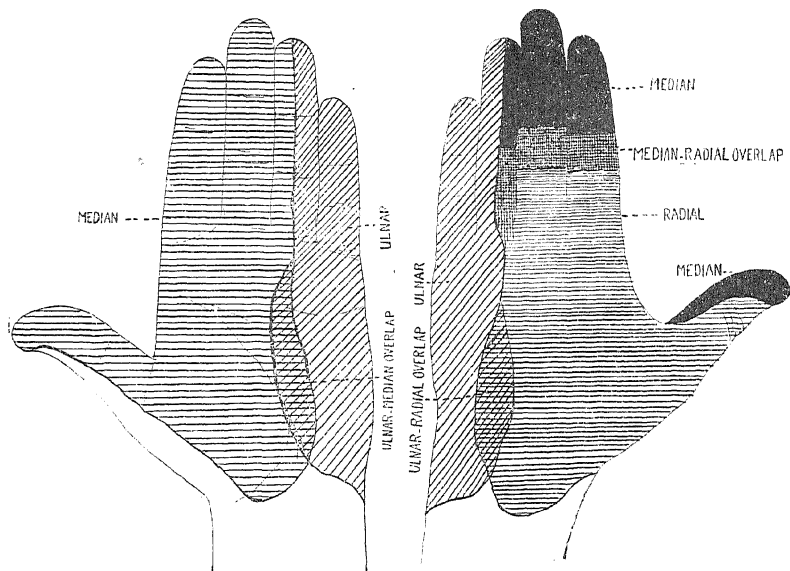


Fig. 98.—Shows the average overlap in the palm of the median and ulnar supply. Deep sensibility is not charted in these diagrams.

Fig. 99.—Shows the average overlapping areas on the dorsum of the hand of the median, ulnar, and radial supplies.

neglected that a good many records have little value. Burrow and Carter⁸ have adopted a set of sensory tests which fulfil these requirements to a large extent and are briefly referred to below. *Figs. 96-99* are kindly lent by the *British Medical Journal*.

Light Touch.—A wisp of cotton-wool is used by many observers, but Burrow and Carter prefer a small brush made of a few sable hairs. It should be drawn over the skin at an acute angle to the surface, so as to avoid all pressure effect. Shaving of the skin is not recommended as a routine by these authors.

Pin Prick.—Head and Holmes's spring algometer is preferred by these authors. They point out that pin prick is a compound of two sensations—one a pressure sense referred to by the patient as 'blunt,' and the other a sensation of 'sharpness.'

Thermal.—These authors use Goldscheider's pointed solid-metal cylinders and median copper wire for punctate sensibility, and they do not use thermal tests as a routine, because of the numerous fallacies attending them.

Deep Sensibility.—(a) Pressure. Head and Holmes's algometer is preferred, either alone, or with the point shielded with cork to give a pure pressure response. (b) Roughness. The Graham-Brown aesthesiometer is used by these writers to obtain threshold values and to compare results with the normal side. (c) Localization. These observers have a large chart, on which they make the patient mark the site at which he feels the stimulus. (d) Joint and muscle sensation; bone sensation. These are tested by gentle pressure, passive movement, and (for the bone) by the tuning-fork.

Discriminating Sensibility.—(a) Size and shape. Common everyday objects are tested. (b) Texture. Wool, cotton, silk, etc., are tested.

Recognition of two blunted Points applied Simultaneously.—The two blunted compass points are applied in the longitudinal axis of the limb, and the results are compared with the other side.

5. ELECTRICAL EXAMINATION.—Burrow and Carter (*loc. cit.*) refer again to the importance of the limb being warm and moist during these tests. They emphasize the value of a positive result in testing with the interrupted current, since it excludes a lower motor neuron lesion definitely. They do not mention that this does not apply for ten days or so after the receipt of the wound. These investigators confirm the view of Duchenne that voluntary power often returns before excitability to the interrupted current. With the constant current the important point is the character of the response—particularly the slowly rising, slowly subsiding, 'worm-like' contraction, which spreads in both directions along the muscle from the point of stimulation. There is a tendency to attach less importance now to the polar changes, and several authorities state that normal muscle may occasionally show ACC greater than KCC, a reaction formerly thought to be confined to lower motor neuron lesions. Less reliance is now placed on condenser discharge tests, though Moynihan² says it is useful in the investigation of the progress of a case.

Burrow¹² and Moynihan² insist on the necessity of examining the conductivity of the nerve at operation by fine sterilized insulated electrodes, before deciding as to the nature of the intervention necessary.

DIAGNOSIS.

Stopford¹¹ very properly points out that if the main principles such as those outlined above are followed out, it is generally fairly easy to make an anatomical diagnosis, but that the exact state of the nerve at the site of the injury is much more difficult to determine before operation. In an examination of more than 2000 cases he concludes that the initial lesion may be: (1) Concussion. No nerve fibres are divided, but there is a temporary loss of conduction.

- (2) Partial division. A variable number of peripheral fibres are divided; or in large trunks, such as the sciatic, the central fibres are damaged and the peripheral ones escape more or less. The lesion is essentially incomplete.
- (3) Complete anatomical division.

In *Concussion*, recovery usually commences in two to four weeks in both sensory and motor fibres. There is seldom any marked wasting in such cases.

Compression (Plate XXXII, C).—This is the usual cause of delayed involvement of nerves, or it may accompany concussion or partial division. It does not appear, as a rule, until the wound is healed and the scar tissue is contracting; and if pain of a neuralgic type appears during the progress of a case, especially if it is evoked by movements which tend to stretch the nerve, it is highly suggestive of this type of lesion, according to Stopford. That author says that in such cases the area of analgesia to pin prick is greater than to light touch. Cases of compression tend to get worse, and eventually complete loss of conduction may occur. Moynihan² says that this type of nerve lesion is the commonest, but Souttar⁶ denies that it ever occurs, and considers that statements to the contrary are due to errors of observation.

Irritation.—Stopford¹⁴ claims that this occurs most frequently in incomplete anatomical division, and is often associated with compression. Occasionally irritative symptoms may arise when the missile has merely passed through the tissues in the neighbourhood of the nerve. Possibly such cases are due to hæmorrhages into the nerve substance or to mild perineural changes. The clinical features associated with irritation are very varied, and are rarely found all together in one case. Stopford states that they are commoner in nerves with many sympathetic fibres such as the median, ulnar, and the internal popliteal part of the sciatic. Among the many symptoms are pain of a burning, pricking, or stinging character. Trophic changes are also generally prominent, and sometimes these seem to be associated with occlusion of one of the principal arteries. According to the severity of the lesion a herpetiform rash, hyperæmia of the skin, hyperidrosis, or œdema may occur. Hyperalgesia is the rule. Trophic sores, glossy skin (*Plate XXXII, D*), ridging of the nails, loss of hair, osteoporosis, and fibrosis of muscles with contractures may occur in some cases (*Plate XXXIII, E*). The nerve is exquisitely tender on palpation, not only locally but distal to the lesion.

Partial Division.—As a rule, according to Stopford, this is associated with symptoms of irritation or compression. In most cases the symptoms are severe at first and do not ameliorate for eight to twelve weeks. The first sign of recovery is generally sensory, but recovery of muscular tone may precede it. In partial division, after a few weeks there is local tenderness over the site of injury not seen in concussion.

Complete Division (Plates XXXIII–XXXV, F, G, H, I).—The symptoms of this are generally well defined. The skin is dry, inelastic, and surface desquamation is delayed. These symptoms are present from the start. The limb is generally cold. True trophic lesions are absent, and this is the best distinguishing feature from incomplete division. After a few weeks the proximal ‘neuroma’ bulb can usually be felt, and when this is compressed there is often pain in the distribution of the nerve. Stopford, in a further paper,¹⁵ describes a case of severe ‘thermalgia’ with clear evidence of endarteritis of the main vessels, apparently caused by the irritation of the vasomotor nerves.

Diagnosis from Functional Symptoms.—Stopford,¹⁶ after mentioning that these may co-exist, refers to Babinski’s views that the superaddition of such functional symptoms is largely the result of faulty treatment and suggestion by the doctor. Stopford divides them into two groups, according as the organic or the functional element predominates.

TREATMENT.

SELECTION OF CASES FOR OPERATION.—Moynihan² states that operation should be undertaken (1) In complete division; (2) In incomplete division when progress is arrested; (3) When there is severe neuralgia or causalgia.

McMurray⁴ advises waiting one month after the healing of the wound before operating. Stiles¹ operates in any case when the progress is unsatisfactory, and considers that many cases are left too long. Macdonald¹¹ takes a gloomy view of the results of operation, and advises waiting several months before deciding on operation in any case where there is voluntary contraction in some muscles, or where there is faradic response. Jocelyn Swan²³ advises three months' interval after the receipt of the wound before interfering. Barnes,¹² as a result of his experiences, advocates operating earlier than he did formerly in partial lesions.

TECHNIQUE.—Souttar⁹ and Stiles,¹ among others, call attention to the necessity for a thorough knowledge of the detailed anatomy of the nerves, in those who undertake the operative treatment of such cases. The latter author rejects a tourniquet because oozing is likely to occur afterwards, and because the valuable guide which the distended vessels affords is lost, while the cutting off of the blood-supply for an hour or more must have a deleterious effect on the damaged nerve. Nearly all writers agree that it is desirable to make long incisions, so that the nerve may be exposed where it is undamaged, and traced back to the site of the lesion. Stiles deprecates the clipping of gauze to the skin edges in these operations, claiming that it interferes with a proper view of the field of the operation; but few surgeons would agree that this is not compensated for by the added security from infection. He and others refer to the necessity for clean cutting with a sharp scalpel while freeing the damaged nerve, and the latter must be handled with the greatest gentleness.

In *complete division* the bulbous extremities should be pared off with a very sharp knife, or a safety razor blade until the whole of the transverse section shows healthy fibres. This must be done thoroughly, for if any scar tissue is left it will very seriously jeopardize the result.

In *incomplete lesions* all scar tissue must be removed from the sheath, the nerve palpated for interstitial fibrous nodules, and then tested for conductivity, using fine electrodes. Stiles recommends longitudinal incisions through the sheath where a fair degree of electrical conductivity persists, but urges free exsection of the damaged nerve with end-to-end suture where there is no conductivity remaining. Stiles, in contrast to most authorities, recommends the use of fine linen thread for the suture material, while Moynihan² and most other writers insist on the necessity of avoiding a non-absorbable suture material, and therefore use catgut. Some authors consider it is dangerous to pass any sutures through the nerve itself, while others use one such tension stitch where there is any difficulty in bringing the ends together. With absorbable sutures we think the danger of causing any serious harm by this step is negligible. Moynihan and several others state that the sutures should take up only the nerve sheath, but this must be regarded as a counsel of perfection rather than a practical procedure, for in our opinion, even when using the finest needles and sutures, it must be impossible to avoid the superficial nerve fibres, so thin is the sheath except in the largest nerves.

Some surgeons prefer to use a minimal number of sutures, merely bringing the cut ends into apposition, while others, basing their method on the necessity not only for accurate coaptation of the cut surfaces, but to ensure as far as possible the avoidance of torsion, use a large number of interrupted sutures, or in large nerves a continuous fine stitch. Where a tension stitch has had to

be used, we find it is often possible to remove it after the coaptation sutures have been tied.

In the early days of the War it was regarded by most surgeons as essential to protect the line of suture by some form of material, dead or living, to prevent adhesions between the nerve and neighbouring tissues. Cargile's membrane, decalcified bone tubes, portions of excised veins or arteries, free or pedicled fascial flaps, were among the many methods advocated, but most surgeons have now abandoned them altogether, though some still use a free or a pedicled fascial flap, particularly when the nerve lies near bone. In many cases the nerve can be left quite safely in its normal bed, and the rapid vascularization which is essential to healing of the nerve will only be inhibited if any 'protecting' method is used. Should it be necessary to guard against pressure or inclusion by callus, it is generally feasible to bury the nerve in healthy muscle fibres in the neighbourhood.

The author of the introduction to the article in the *Daily Review of the Foreign Press*¹ states that resection should not be done if any intact fibres connect the two ends. He advocates the careful excision of scar tissue, leaving the undamaged fibres *in situ*, followed by separate suture of the rest of the nerve. This, in our opinion, is open to grave technical objections in actual practice, as the unresected piece of nerve becomes acutely kinked when the gap in the remainder is obliterated, and this must have the effect of interfering with its blood-supply, and therefore with its function.

Usually the nerve ends can be brought together without much trouble; but if there is much of a gap, it can often be bridged by: (1) Free dissection of the nerve—the extent to which this is possible is only limited by the necessity of avoiding damage to the branches of the nerve and to its own proper blood-supply; (2) By flexing joints, and by altering the posture of the limb; (3) By dislocation of the nerve from its proper bed and making it take a new path, e.g., displacing the ulnar nerve from behind the internal epicondyle to the front. It is said that this procedure will make a gain of 3 to 5 cms. in the length of this nerve.

When the nerve gap cannot be bridged by any of the methods described above, there is a wide divergence of opinion as to the best method to adopt. In the upper limb we think that it is so essential to get end-to-end suture, that it is justifiable to excise an inch or two of the humerus in order to facilitate this. Most German authors¹ seem to have used Edinger's tube made from a calf's artery hardened in formalin, with the idea that it would act as a conducting mechanism for the new nerve fibres; but the results as recorded seem to have been uniformly unsatisfactory. Kölliker¹ and others grafted the proximal end directly into muscle, and Elsberg has also shown that this is quite satisfactory in experiments on animals.¹⁹

Hofmeister¹ implanted both ends into adjacent nerves, the gaps being 4 to 20 cms. long; but no very good results seem to have been achieved. Eden¹ states that the ends of the anterior crural inserted into the femoral artery and vein, the circulation continuing, become joined by true nerve tissue.

Forsmann,¹ following Ingebrigtsen,²⁰ considers autoplasmic grafts the best method of bridging wide gaps between nerve ends. Jemtel²² reports a case of heteroplasmic graft in a case of injury to both median and ulnar, with severe trophic phenomena. The latter disappeared after the operation, but the motor phenomena were not affected. It does not appear to us that this is to be ascribed to the graft, but rather to the excision of the damaged nerves.

Moynihan² strongly opposes the implantation of damaged nerves into healthy ones. Souttar³ considers it, on the other hand, to be justifiable on the grounds that it is possible to divide up to one-third of the fibres of a healthy nerve

without harm; but he does not say whether this can be done with impunity to all nerves at any part of their course; yet this essential knowledge must be forthcoming before we are justified in adopting this procedure. Cases are from time to time claimed as successes by this and similar methods, but it would appear that they are based on a too optimistic view of the progress of the case when seen at a comparatively short interval after the operation. Much the same can be said for the method of turning flaps of the nerve up or down; they have little or nothing to commend them. If all efforts to effect end-to-end suture fail, it is better to have recourse to tendon grafting or transplantation than to risk damage to healthy nerves by adopting methods which have no sound basis of experimental or clinical proof for their efficiency. Much excellent work has been done to establish the best methods of tendon transplantation in the various types of nerve defect, and some very good results have been achieved (Moynihan²), especially in the musculospiral group. Finally, it must not be forgotten that even when nothing at all of an operative nature is possible, as in some cases of injury to the ulnar and median nerves, a great deal can be done to improve the patient's state by re-education, though we can hardly go as far as Souttar, who says that the possession of an ulnar nerve must be considered a luxury to a great many individuals.

A very considerable interest centres around that group of painful nerve lesions called by Weir-Mitchell 'causalgia' (*Plate XXXV, K*), particularly in relation to the actual causation, and the treatment of the condition. Sicard²⁴ says that these cases are characterized by their tendency to affect the median and the sciatic nerves, and by the paroxysmal nature of the pain. The symptoms are extremely resistant to medical treatment, and the only form of relief which the patient can get is by wrapping wet cloths round the limb, and many of them insist on keeping these on continuously. Sicard says that neurolysis has been disappointing in the treatment of these cases, and that with Imbert he has attempted to cure them by dividing the nerve well above the damaged area but without interfering at the site of the injury. Relief but not cure followed. He finds, however, that by injecting 1 to 2 c.c. of 60 to 80 per cent Alcohol into the nerve well above the lesion cure nearly always followed; in fact, he says that in only 1 case out of 43 was there a complete failure. Leriche and others have advocated the resection of the perivascular sympathetic plexus in the treatment of this condition, and others have even advised the excision of a segment of the artery, together with its sympathetic plexus. Burrow and Carter⁵ deny that causalgia can be cured by alcohol injections, and they claim that the pathological basis of the condition is a scar in the nerve itself, and that the condition is generally curable by a free resection of the whole of the damaged tissue. Giron²⁵ maintains that while the causalgia of Weir Mitchell is due to a lesion in the nerve itself, there is also a type of painful nerve lesion which is due exclusively to a sympathetic disorder. For the former, Sicard's alcohol injection will, he says, effect a cure, while for the latter Leriche's method is necessary.

PRE- AND POST-OPERATIVE TREATMENT.—This may be considered under two headings, viz.: (1) *Methods for improving the nutrition of the parts*; (2) *Postural methods*.

1. Methods for Improving the Nutrition of the Parts.—Under this group are:—

Massage.—The main effect of this is in improving the circulation, and in removing oedema. For its most efficient application the limb must be warm, and indeed this applies to times other than when the patient is having special treatment.

Exercises.—Souttar,⁹ among others, refers to the well-known Zander apparatus, and thinks highly of them. These appliances, however, require very careful

supervision, as patients tend to weary of the monotony of some of the movements, and in such cases more harm than good may be wrought. On the whole, too much is expected of and claimed for them.

Whirlpool Baths.—This form of treatment is essentially a form of gentle massage combined with moist heat. It is a valuable adjunct to the other methods, but unfortunately exaggerated statements of its powers have been made, not only in the lay but in the medical press.

Electricity.—It seems certain that electricity has no direct action on the actual regenerative processes in the nerve itself, although some authors advise local diathermy at the site of the lesion for this purpose. Cooper,²⁶ who has had an exceptionally wide experience of the treatment of cases by these methods, maintains that electricity is only of benefit in so far as it is able to produce contraction in muscle fibres, the action being therefore as it were an indirect one. Bristow⁴ agrees substantially with this view, and warns against the danger of fatiguing the muscle by over-stimulation. (*See also p. 21.*)

Re-education.—This is an extremely valuable method of dealing with cases, particularly in the later stages when the patient is beginning to recover some voluntary power, and also in those cases where it is not possible to do much for the damaged nerve itself, but where by proper re-education the patient may be taught to use what muscles remain to him to the best possible advantage. The outstanding necessity in this form of treatment is to create and maintain the interest of the patient for the work.

2. *Postural Methods.*—Under this heading we have first to consider the fundamental principle that the paralyzed muscles must not be allowed to be stretched or to be placed under a mechanical disadvantage during treatment. It has been laid down as an axiom that the affected muscle must be kept relaxed during the whole period between the receipt of the injury and the return of full function, and while this has not been proved to be essential, as Langley has shown experimentally,¹⁸ it is wise to avoid anything amounting to stretching of the paralyzed muscle. It is probable, on the other hand, that the slight degrees of movement which occur during the daily passive manipulations of the limb, e.g., when the patient is having massage, are not really detrimental.

A question which sometimes arises is, when, after nerve suture in which the limb has had to be put up flexed, should the limb be straightened. An interval of three weeks is generally enough, as there is very little tendency to stretching of the suture line, as we have been able to demonstrate on more than one occasion when re-exposing the operation area at a later date.

In order to carry out the proper postural treatment, certain appliances have to be used, and besides keeping the limb in a proper posture, they must not be so heavy as to fatigue the limb. For the musculospiral, Clarke and Spriggs²⁶ have endeavoured to find out the best possible position for the hand. They point out that it is practically impossible to relax efficiently the extensors of the thumb without abduction of the hand, and as they say, this is impossible to achieve with the hand extended. They conclude that for ordinary use the short cock-up splint is the most useful. This splint leaves the thumb and fingers free to move. They found the long cock-up, i.e., a splint which extends the proximal phalanges, is too irksome for ordinary use, though they recommend it for special cases in the later stages.

Privat and Belot²⁷ lay down the rule that the use of fixed immovable apparatus is a mistake, and that an apparatus should be provided which, while keeping the limb with the paralyzed muscles relaxed, yet permits the patient to move his hand through a limited range against the action of a spring, the strength of which should be so attuned that, in the case of the musculospiral, a patient with feeble flexors is provided with a weak spring, and vice versa.

It is also possible, with the models they describe, to carry out movements of adduction and of abduction at the wrist (*Fig. 100.*).

These authors discuss the cause of the failure of so many of the foot-drop appliances in cases of external popliteal injury, and they trace it to a neglect

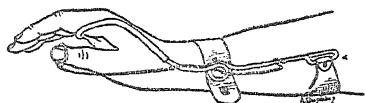


Fig. 100.—Apparatus of Privat and Delot for musculospiral paralysis. (*Archives Médicales Belges.*)

of the disabilities in walking which these patients experience. The patient's foot, instead of coming into contact with the ground with the heel first, strikes with its point first, and, having then been laid flat, it is subject to numerous lateral strains whenever the surface of the ground is uneven, and the lateral ligaments naturally suffer. They con-

clude that a proper appliance for external popliteal paralysis should fulfil the following desiderata: (1) It should eliminate 'steppage' by raising the point of the foot during the swing forwards of the limb; (2) It should fix the foot firmly, so as to prevent absolutely all movements of eversion and inversion at the ankle; (3) It should be as inconspicuous as possible. In their excellently illustrated article they describe an appliance which subserves these necessities.

It is very cheap, costing about half-a-crown, and consists essentially of two rigid lateral bars or rods of steel, fixed rigidly below into the sole of the boot, one on each side, just in front of the heel, while above it has a leather strap round the leg, just below the bulge of the calf; the strap passes through loops at the upper ends of the lateral bars, and is fastened by a buckle (*Figs. 101-103.*).

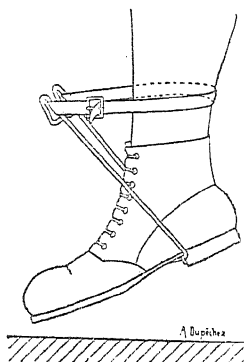


Fig. 101.—Apparatus of Privat and Delot showing foot drop.



Fig. 102.—Apparatus (army pattern) in position.

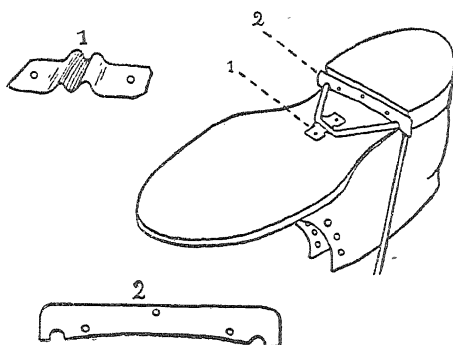


Fig. 103.—Method of fixation. (1) Plate with groove under instep; (2) Bar in front of heel. (*Figs. 101-103 are redrawn from the 'Archives Médicales Belges.'*)

PROGNOSIS.

ORDER OF RECOVERY OF FUNCTION.—Recovery is most rapid and most complete, as a rule, in nerves with a large percentage of motor fibres, apparently because the chance of motor fibre becoming united to motor fibre is greater than in those nerves with a large admixture of sensory fibres. Burrow and Carter⁵ state that, in general, trophic and vasomotor functions return first, next deep sensibility, and then the sensations of roughness and pressure-pain. Accurate localization of tactile pressure precedes that of sense of position and range of movement. Radiating and ill-localized sensations referred to wide areas appear next, and they have a high threshold value and agree fairly closely, according to these writers, with the protopathic sensations of Head and Rivers. Following on this, sensibility to light touch returns, and the radiating sensations referred to above disappear. The last of all to return is stereognosis. Stopford¹⁴ states that in cases where the main artery has been tied, recovery is much delayed. Motor functions return as a rule after the so-called protopathic sensations, and the most proximal muscles recover before the distal ones. Burrow and Carter confirm the view that voluntary power comes back, as a rule, before excitability to the interrupted current.

A large number of statistics are available concerning the end-results of cases, whether subjected to operation or not, but we think there is little object in quoting them, as the various groups of cases cannot be fairly compared while no definite standards are available to define what is meant by such terms as 'partial recovery,' 'marked improvement' 'slight improvement,' etc. Even when such a definite statement as 'complete cure' is employed, it appears to be used very laxly by some authors, whereas it should mean the return of the whole of the functions, both motor and sensory.

Burrow and Carter have summarized the results of a thousand cases under their care, and these are briefly as follows:—

Brachial Plexus.—Root lesions numbering 29 were met with, involving most often C5 and C6. As they point out, the lower roots are in such proximity to the great vessels that the latter are generally damaged as well, and the cases are very often fatal and therefore do not reach the base. Recovery in this group is surprisingly slow. There were 60 lesions of the cords. These observers state that in contrast to the last group the recovery after suture is quicker than would be expected in lesions so far from the periphery.

Ulnar Nerve (327 cases).—An average of nine months was found to occur before the return of voluntary power. Complete recovery of sensation was not found in a single case.

Median Nerve (242 cases).—The forearm muscles recover long before the small muscles of the hand supplied by this nerve, the average for the first group being about seven to eight months, and for the latter fourteen to twenty months.

Musculospiral (204 cases).—Return of function more rapid than in any other nerve observed after suture. They state that apparently the interval elapsing between the receipt of the wound and the suture does not influence the rate of recovery, although this is contrary to the generally accepted views on the subject. They state that the radial branch has no exclusive area of supply for deep sensibility. Recovery of the dorsiflexors of the wrist occurs in seven to eight months on an average. The last muscles to recover are the thumb extensors. The earliest time noted for complete recovery was fifteen months.

Sciatic Nerve (121 cases).—There were 97 external popliteal lesions to 8 internal popliteal. Recovery is very satisfactory in the first group, probably

because of the large number of motor fibres compared with sensory which compose it.

REFERENCES.—¹*Med. Supp. Rev. Foreign Press*, 1918, Oct., 314 et seq.; ²*Surg. Gyn. and Obst.* 1917, 595; ³*Lyon Chir.* 1918, Mar.-April, 245; ⁴Discussion at Alder Hey Hospital, *Brit. Med. Jour.* 1918, i, 379; ⁵*Il Policlinico*, 1917, Sept. 23, 1177; ⁶*Revista Español de Med. y Cir.* 1918, July, 2; ⁷*Ibid.* Aug., 49; ⁸*Brit. Med. Jour.* 1918, ii, 535; ⁹*Ibid.* 1917, ii, 817; ¹⁰*Nerve Wounds* (Bailliére, Tindall and Cox), 1917; ¹¹*Brit. Med. Jour.* 1918, ii, 6; ¹²*Ibid.* i, 408; ¹³*Ibid.* 720; ¹⁴*Ibid.* ii, Oct. 5; ¹⁵*Ibid.* i, 465; ¹⁶*Ibid.* 795; ¹⁷*Ibid.* 45; ¹⁸*Ibid.* 141; ¹⁹*Science*, 1917, 45, 318; ²⁰*Lyon Chir.* 1917, Sept.-Oct., 884; ²¹*Presse Méd.* 1917, Nov. 15, 651; ²²*Lyon Chir.* 1917, Sept.-Oct. 895; ²³*Presse Méd.* 1918, Mar. 21, 158; ²⁴*Lancet*, 1918, i, 213; ²⁵*Presse Méd.* 1918, Nov. 14, 584; ²⁶*Brit. Med. Jour.* 1918, ii, 280; ²⁷*Arch. Méd. Belges*, 1918, Sept., 807; ²⁸Discussion reported in *Lancet*, 1918, i, 469.

J. Ramsay Hunt, M.D.

Spastic Paralysis.—Bruce Gill,¹ in a discussion of the surgery of this condition, presents his results with the **Stoeffel Operation**. This procedure consists in the reduction of power in the contracted spastic muscle by resection of certain of the individual fasciculi of the corresponding nerve trunk. Stoeffel discovered that there is a finer anatomy of the nerve trunk, and that the individual nerve fasciculus has a fixed sensory or motor function. These may be readily isolated by an operative procedure, and their respective distribution detected by the use of an electrode. For example:—

To correct talipes equinus, the internal popliteal nerve is exposed in the popliteal space. It is dissected into numerous bundles which are found to supply the various muscles of the calf of the leg. A portion of each bundle supplying a spastic contracted muscle is then excised for a length of 1 to 2 inches. Approximately one-fourth to two-thirds or three-fourths of the nerve-supply to a muscle is thus resected, depending on the amount of spasticity and deformity present in each case. The electrode is used in distinguishing the nerve-bundles which supply the various muscles, except when the surgeon's knowledge of the anatomy of the nerves enables him to dispense with its assistance. For contracture of the hamstring muscles, operation is performed upon the sciatic nerve in the upper part of the thigh. For adductor spasm one or both branches of the obturator nerve are excised. In the upper extremity the median nerve is exposed in the flexure of the elbow, and the branch going to the pronator radii teres and the branches to the various flexor muscles of wrist and fingers are resected as desired.

During the last four years the author has performed thirty-five Stoeffel operations on the popliteal, the sciatic, the obturator, and the median nerves. The results have been so satisfactory that the operations have been done routinely in the author's orthopaedic service.

It would be interesting, he says, to know what occurs in the muscles following the Stoeffel operation. Part of the nerve-supply of the muscle has been removed and a portion of the muscle paralyzed. It seems probable that in time the remaining nerves will neurotize the entire muscle. Only time will tell whether the good results of the operation will be permanent.

Neurotization of Paralyzed Muscle.—The neurotization of paralyzed muscles by implantation of a motor nerve or by direct implantation of healthy muscle has aroused considerable interest in recent years, as a possible substitute for such procedures as nerve anastomosis, tendon fixations, and muscle transplantation. J. J. Nutt² presents a clinical and laboratory study bearing upon the direct neurotization of paralyzed muscle by muscle grafting. The operation which Nutt used in his experimental work and on his patients is as follows: An incision is made to bring into the field the bellies of the two muscles. Both are split lengthwise. The deeper edges of the two opened surfaces are sewed

together with chronicized catgut. A few interrupted sutures are so placed as to approximate the central parts of the two freshened surfaces, and then the upper edges of the cuts are sewed together. The skin wound is then closed.

It will be seen that even if nothing is gained by such an operation, nothing is lost. No function is sacrificed, as is the case in such operations as muscle transplantation, tendon fixation, and nerve implantation. The objection to early operation, which is so valid in all other procedures, does not hold good for this operation.

Sixteen cases are reported in the order of operation. In four of them, two paralyzed muscles each were operated on, making a total of twenty muscle graftings. Seven were complete failures. Six patients show a slight return of power, which, however, is by no means sufficient to be of functional use. This slight power, as we know from similar results in muscle transplantation, may add to the strength of the joint and thus be of some benefit. Four cases have given fair results, and three good results.

REFERENCES.—¹*Ann. Surg.* 1918, 529; ²*Jour. Amer. Med. Assoc.* 1917, 2082.

NERVOUS SYSTEM, SYPHILIS OF. (See SYPHILIS OF NERVOUS SYSTEM.)

NERVUS ACUSTICUS, TUMOURS OF. *J. S. Fraser, M.B., F.R.C.S.*

Colonel Harvey Cushing¹ points out that in the past, responsibility for the diagnosis and treatment of tumours of the eighth nerve has been shared by the neurologist, the ophthalmologist, the otologist, and the general surgeon. Surgical failures were so frequent that utter discouragement prevailed. Recent advances, however, have shed much light on the question, e.g., the electric ophthalmoscope, x-ray examination, the rotation and caloric tests of Bárány. During the past fifteen years the subject has advanced from the diffuse presentation of tumours of the posterior cranial fossa to the clinical differentiation of intracerebellar from extracerebellar growths, and particularly of those of the cerebellopontile angle from all others. Finally, in the group of cerebellopontile tumours, those originating in the eighth nerve have come to stand out with comparative clearness from those which secondarily involve this and other nerves through pressure. Owing to the characteristic chronology of their symptoms, acoustic tumours may, as a rule, be sharply distinguished from all others.

Of Cushing's 784 cases of brain tumour, the character of the lesion has been verified at operation or autopsy in 468 instances. Of the latter, 334 affected the fore-brain and 134 the hind-brain. Supratentorial tumours are thus between two and three times as numerous as those of the posterior fossa. Further, the verified intracerebellar lesions (69) do not greatly exceed the extracerebellar growths (56). The verified tumours of the cerebellopontile angle far outnumber (42 to 14) the extracerebellar tumours which originate elsewhere; while, finally, acoustic tumours outnumber other growths arising in the angle in the proportion of 30 to 12.

ETIOLOGY AND INCIDENCE.—*Trauma* does not seem to play any very important rôle in etiology (6 out of 30 cases). Hessler has assembled nineteen examples of acoustic tumour due to infection in patients who had suffered from ear disease. Sternberg regards acoustic tumours as of *embryonal* origin, and attributes them to an *anlage* of glia tissue. Under the influence of the vegetative changes which occur during *pregnancy* there is either a disposition for tumours to develop or for a pre-existing lesion to take on more rapid growth (von Leyden). *Sex* does not appear to influence these lesions. *Age*: the average age of Cushing's thirty patients was 38 years: the youngest 21, the oldest 53.

He holds that a patient under 20 with a cerebellopontile-angle syndrome in all likelihood is suffering from a lesion other than an acoustic tumour—usually an intracerebellar glioma.

PATHOLOGY.—Isolated tumours involving the nervus acusticus arise from the endoneurium which is peculiar to this nerve and gives them their distinctive histological appearance. They originate, as a rule, in the distal portion of the nerve within the auditory canal, and consequently may cause through pressure absorption a dilatation of the porus acusticus internus. From this point the tumours spread inward. The adjoining structures in the cerebellopontile angle suffer from secondary compression effects. Ultimately an internal hydrocephalus is produced, and the general pressure phenomena of an intracranial tumour rapidly supervene. The growth is composed of two main sorts of tissue—a dense fibrous tissue and a loose areolar tissue possessing some of the architectural characteristics of a glioma. The tumours are specific for the acusticus, and should not be confused with other growths arising in the cerebellopontile angle.

SYMPTOMS.—The clinical diagnosis of an acoustic tumour can be made with reasonable assurance only when *auditory manifestations definitely precede the evidences of involvement of other structures in the cerebellopontile angle*. Unfortunately, however, patients rarely call attention, of their own accord, to these premonitory auditory symptoms. It is rare for the eighth nerve to be the only one affected by the time patients present themselves in the neurological clinic. (1) *Auditory and vestibular Symptoms.*—In 25 of the 30 cases the inaugural symptoms were auditory. As a rule the first symptom was tinnitus, which preceded the onset of deafness. In seven of the cases this tinnitus was bilateral. Seven patients showed some remains of hearing, while a smaller number showed some response to caloric tests. This suggests that a complete vestibular paralysis is more frequent than a complete cochlear one. Henschen, indeed, takes the view that these tumours arise more often from the vestibular nerve, and it is not surprising to learn that vestibular symptoms often precede any disturbance of hearing. A sensation of giddiness is not uncommon, but in only one of Cushing's cases was the early history of vertigo and falling so definite as to lead to the diagnosis of Ménière's disease. Patients usually find that the vertigo is relieved if they lie on the sound side, and increased by turning on to the affected side [as in labyrinthitis.—J. S. F.]

Caloric tests show great lowering of vestibular irritability; indeed, Bárány says he has never obtained a caloric response in the examination of more than thirty cases, whereas some hearing may be preserved. Up to the present time, apparently, x-ray examination has not proved of great value in the diagnosis of tumours of the eighth nerve; stereoscopic radiography, however, may lead to improvement in this direction. (2) *Suboccipital discomforts.*—Patients complain of paroxysmal pain, usually on the side of the lesion, sometimes occipital and sometimes frontal, but apt to spread from back to front. Severe boring retro-orbital pain is often present. On stooping or straining, soreness and stiffness in the neck may be felt. These discomforts are usually more troublesome at night and in the morning, and may wear away later in the day. A protective tilting of the head has been noted, the mastoid being drawn down towards the shoulder on the affected side. (3) *Cerebellar symptoms.*—About a year after the acoustic symptoms first appear there is evidence of cerebellar inco-ordination, often before there is much evidence of cerebral nerve involvement. Occasionally this sequence is reversed. The first cerebellar symptom is usually unsteadiness of gait, which may vary from a slight tendency to fall on turning, to a pronounced drunken reeling. This is often associated with a distinct loss of power or tone in the muscles on the homolateral side—the lower

extremities being more markedly affected than the upper. The patient tends to fall to the side of the lesion and to deviate towards this side on walking. Patients also find it more difficult to balance on the foot of the affected side. Inability to perform rapid movements of pronation and supination has also been noted (adiadokokinesia). Cushing states that the slow component of the nystagmus is toward the side of the lesion, [i.e., the nystagmus is toward the sound side.—J. S. F.] In a number of cases a vertical nystagmus on looking upward has been recorded. (4) *Adjacent cerebral nerve symptoms*.—These tend to fluctuate in their intensity. At the time of admission to hospital most patients show evidence of involvement of the fifth, sixth, and seventh nerves, usually on the side of the lesion alone. In 14 of the 30 cases, however, there was some affection of the contralateral side. It is unusual for the third nerve to be affected. Next to the eighth nerve itself the trigeminal is probably the first to be involved. Cushing says that the ninth, tenth, eleventh, and twelfth nerves, while sometimes affected, do not play an important symptomatic rôle in acoustic tumours, although the foramen of exit of the three first named lies close to the internal auditory meatus. (5) *General pressure symptoms*.—Headaches of the pressure type, with nausea and vomiting, and a subjective blurring of vision due to early papilloedema, have been recorded as fairly early symptoms. Out of 30 cases, 2 were already blind on admission, in 6 vision was reduced to shadows, in 18 the process was advanced, and in 4 only was the condition an early one. A blunting or loss of the sense of smell may occur in the advanced stages of increased intracranial tension, and one instance of cerebrospinal rhinorrhœa has been met with. (6) *Psychic disturbances*.—So-called 'frontal-lobe symptoms' may occur as an early feature, but are more usually met with in advanced lesions. (7) *Dysphagia and dysarthria*.—Difficulty of swallowing first manifests itself by the consciousness of effort required in the act and by the tendency of food particles to go 'the wrong way.' Dysarthria, as shown by thickness, slurring, and indistinctness of speech, is an even more characteristic symptom of acoustic tumours. Cushing met with these two symptoms in 21 out of the 30 cases. (8) *Cerebellar crises*.—The characteristic suboccipital discomfort may lead to paroxysms of a most agonizing type, with retraction of the neck and back, respiratory difficulties, altered pulse-rate, a sense of impending death, and often with loss of consciousness. Such 'vagal' attacks, or 'cerebellar seizures,' were observed in seven of Cushing's patients. They are particularly characteristic of cerebellopontile angle tumours, though not necessarily of acoustic neuromas.

One of the notable features is the great variation from time to time in the character and severity of the symptoms. The subjective symptoms particularly alter very much. In one case, indeed, the symptoms entirely disappeared for a few months. Cushing holds that this phenomenon is best explained by circulatory obstruction. The tumour actually lies within the lateral cistern, the proper evacuation of which is more or less interfered with by the growth. Cushing emphasizes the fact that a circumscribed serous meningitis of this region [Bárány's symptom complex.—J. S. F.] may be difficult to distinguish from an actual acoustic tumour. Cerebellar crises are probably due to periods of excessive tension. *Sensory and motor paths*.—Some patients complained of a sense of numbness on the homolateral side of the body. The deep reflexes were exaggerated in almost all cases, but, as a rule, were equally so on the two sides.

PROGNOSIS.—The progress of the average case occurs more or less as follows :

- (1) Stage of auditory and vestibular manifestations (one year's duration) ;
- (2) Intermediate stage with occipito-frontal pain, cerebellar inco-ordination, and involvement of adjacent cerebral nerves ;
- (3) Terminal stage of increased

intracranial tension, with choked disc; dysarthria and dysphagia; cerebellar crises and respiratory difficulty. The general pressure symptoms (Stage 2) usually lead to the patient's admission to hospital. This intermediate period varies from six months to a year.

DIAGNOSIS.—The ideal is to recognize the lesion when the eighth nerve alone is involved, but many other disorders give rise to tinnitus, deafness, and labyrinthine vertigo. When the primary auditory symptoms are followed by numbness of the corresponding side of the face, by periods of diplopia and lowered vision, by occipito-frontal pain and stiffness of the neck, by unsteadiness of gait, and, finally, by difficulty in swallowing and articulation, we may be reasonably sure of the diagnosis on the history alone. Neurological examination would then reveal a choked disc, cervical rigidity and tenderness, deafness and loss of vestibular response on the affected side, loss of the corneal reflex, lowering of taste perception, weakness of the lower part of the face, nystagmus, and muscular inco-ordination of the cerebellar type.

Differential Diagnosis.—Cushing gives the following list of possible errors in diagnosis: (1) The tumour syndrome is misinterpreted and the symptoms ascribed to another lesion, e.g., Ménière's disease, Bell's palsy, trigeminal neuralgia, multiple sclerosis, multiple neuritis of cerebral nerves, occipital neuralgia, torticollis, bulbar paralysis, locomotor ataxia, tuberculous or syphilitic basal meningitis, circumscribed serous meningitis in the lateral cistern, gastric ulcer or carcinoma. (2) A tumour is correctly diagnosed but incorrectly localized—e.g., tumours of the corpora quadrigemina, psammoma of the third ventricle, tumours of the temporal lobe, of the Gasserian ganglion, of the cortical facial area, or of the frontal lobe. (3) The tumour is correctly diagnosed and localized in the cerebellopontile angle, but the relation of the growth to the eighth nerve is not appreciated. Here an accurate chronological history of the case is very important.

SURGICAL TREATMENT.—Four methods of approach have been recommended: (1) *The unilateral operation.* This procedure has been accompanied by a shocking mortality. (2) *The translabyrinthine operation* was suggested by Panse in 1904, and inevitably leads to homolateral facial paralysis. The depth of the wound and the narrow field are obvious drawbacks. Further, the operation does not serve as a palliative in case of the almost inevitable incomplete removal of the lesion, while the resultant leakage of cerebrospinal fluid through the ear is likely to lead to meningitis. The operation may be rendered very difficult by severe bleeding from the jugular bulb. Cushing grants that in a very early tumour limited to the internal auditory meatus the translabyrinthine operation may in time become the operation of choice. This will, however, depend on far more precocious and exact diagnosis than we are yet capable of. (*See MEDICAL ANNUAL, 1916, page 109.*) (3) *Combined suboccipital and petrosal operation.* (4) Cushing himself in 1905 introduced the *bilateral operation*, and claims the following advantages: (a) As it is not always possible to determine the side of the lesion before operation, it is an advantage to expose both cerebellar hemispheres. (b) The hemisphere on the unaffected side can be dislocated to give better access. (c) Intracranial tension can be diminished by obtaining a flow of cerebrospinal fluid when the posterior margin of the foramen magnum is removed.

For the steps of the operation the reader is referred to Cushing's own work, which is excellently illustrated. Briefly, however, it may be stated that the patient lies in the face-down position, with his face and shoulders supported on outriggers. The anaesthetist of course must sit on a low stool; Cushing relies on the Connell apparatus, though he admits that intratracheal anaesthesia is the ideal method in all cerebellar operations, in view of the possible

need of artificial respiration. A curvilinear cut is made from mastoid to mastoid, arching above the occipital protuberance. A vertical incision in the middle line is now carried down from the middle of the preceding incision to the spine of the fifth cervical vertebra. Every possible precaution should be taken to avoid loss of blood. The fascia is divided along the superior curved line and drawn down, and the muscles scraped back from the bone so as to expose the margin of the foramen magnum and the edge of each mastoid process. With a motor-driven burr one or more primary perforations are made over each cerebellar hemisphere, and enlarged with rongeurs to the full extent of the denuded area of bone. A minute primary dural opening is next made low down near the foramen magnum to secure fluid and relieve tension. If this fails, one lateral ventricle should be tapped through a separate bony opening made well above the superior curved line. After this the dura will lose its tension and can be safely opened. The lateral lobe of the cerebellum on the affected side is drawn towards the middle line, and the tumour exposed. Cushing doubts very much whether one of these lesions can with safety be totally enucleated. He incises, or even bisects, the tumour, and removes as much as possible with a long-handled blunt spoon. The cerebellopontile angle must be left completely dry before the dislocated cerebellar hemisphere is allowed to settle back in place. The accurate closure of the wound in layers is necessary. The duration of the operation is usually about three hours. The patient is left unmoved on the table until consciousness is regained.

Results.—Formerly the operative mortality was about 70 per cent, but Cushing has reduced this to 20 per cent. The saving of vision is very important, though often little remains when the patient is admitted. Of fourteen cases with advanced choked disc, five regained normal vision, five had useful vision, and four impaired vision. Most of Cushing's female patients have been able to resume their household duties.

REFERENCE.—¹*Tumours of the Nervus Acusticus* (W. B. Saunders Company, Philadelphia and London, 1917).

NEURALGIA. (See NEURITIS.)

NEURALGIA, TRIGEMINAL.

J. Ramsay Hunt, M.D.

The frequency and painful nature of trigeminal neuralgia—*tic douloureux*—render the question of its treatment of great interest to all—general practitioner or specialist.

In recent years the **Alcohol Injection** method has acquired great vogue, especially at the hands of neurologists and internists: while the surgeons, who have had most experience in this field, still hold that in severe types of epileptiform neuralgia the surgical method of **Excision of the Ganglion** is the proper mode of treatment.

J. Hutchinson,¹ in a discussion of the *operative treatment*, states that for epileptiform neuralgia involving the superior and inferior maxillary divisions of the fifth nerve, the only treatment which can afford a lasting cure consists in operating upon the Gasserian ganglion. Because of the dangers of removing that portion of the ganglion concerned with the innervation of the eye (ophthalmic division), Hutchinson advocated in 1898 a modified procedure which involved a partial excision of the ganglion only, sparing that portion concerned with the innervation of the eye. He has operated in all upon 60 patients by this method, with only a single death. This exceptionally low mortality is to be attributed to the modified procedure, which is less formidable and eliminates the danger of serious sequelæ common to the complete excision operation. Peripheral neurectomy is usually only temporary in its effects, and relapse of the neuralgia is practically certain.

Hutchinson states that when he first brought forward the modified operation it was with a feeling of certainty that relapse would occur in the ophthalmic branch which had been allowed to remain. With a few exceptions, however, this has not been the case, and in only one of his patients did such a recurrence manifest itself: this was promptly relieved by resection of the supra-orbital nerve. He refers to the Abbe method, which consists of section of the second and third divisions and plugging the foramen rotundum and foramen ovale with rubber or other suitable material, and states that he and Abbe are in entire agreement as to the great advantage of sparing the ophthalmic division. For this reason he does not approve of the section of the root of the fifth nerve in the proximal side of the ganglion, as recommended by Frazier and Spiller, and also because it necessitates opening the dura, and is a more hazardous procedure.

Hutchinson refers to certain rare *paralytic complications* in his large series of 60 cases. He has noted facial palsy a few times, due probably to separation of the dura mater from the petrous bone and the settling of blood-clot in the region of the aqueduct of Fallopius. In 4 cases there has been a contralateral weakness of the arm and leg, apparently resulting from retractor pressure on the brain during the operation. Attention is also directed to a curious fact which has hitherto escaped comment, namely, the recurrence of the neuralgia on the opposite side after the original pain had been cured by excision of the ganglion. Hutchinson has encountered three such cases, and the question of their treatment is a serious one, on account of the danger of paralyzing the muscles of mastication on both sides.

J. A. Sicard,² after a large experience with the **Alcohol Injection Method** in the treatment of trigeminal neuralgia, believes this to be the method of choice in all cases which fail to respond promptly to anti-neuralgic medication. He believes that surgery has lost its hold on these cases, that it is ineffectual, often mutilating, and disfiguring. Thus do authorities disagree. After trying all of the agents which have been advocated, such as osmic acid, the chromates, ether, etc., he regards alcohol as the chemical agent of election, varying in strength from 70 to 95 per cent. There are three stages of neurolysis: superficial, medium, and deep. The superficial or anterior stage is represented by the ophthalmic nerve where it emerges through the supra-orbital hole or notch, by the infra-orbital, and by the mental branch. The medium stage comprises Spix's spine (origin of the inferior dental canal) and the posterior palatine canal. The deep or posterior stage is made up of the sphenoidal fissure (ophthalmic nerve), the foramen rotundum (superior maxillary nerve), and the foramen ovale (inferior maxillary nerve). He uses local anæsthesia (novo-cocaine or stovo-cocaine in 1 per cent solution). The quantity of alcohol injected should not exceed 1½ c.c. The pain of the neurolysing injection cannot be completely avoided; it may, however, be minimized by waiting four to five minutes after injecting the anæsthetic before proceeding with the alcoholization. Great care should be exercised not to inject an artery, as occlusion of the vessel follows, with resulting gangrene. If therefore blood should flow from the needle, alcohol should not be injected. He has observed ocular palsies of weeks' or months' duration after deep injections, but recovery of the paralysis invariably followed. To avoid this complication one should wait four or five minutes after injection of the anæsthetic, when an ephemeral diplopia will develop if the cocaine comes in contact with the *danger zone* of ocular nerves. Facial paralysis is also occasionally observed from an error in technique. There is usually œdema and swelling of the soft parts, which persists until the second day.

Conditions Indispensable to Success.—The intervention is limited to cases of true facial neuralgia of the so-called 'essential' variety; (1) Whenever the pain in facial neuralgia persists continuously with no distinct intervals of relief,

it is not a case of 'essential' neuralgia ; (2) Cases of facial neuralgia which, not having been already treated surgically or by local injections, are accompanied by cutaneous or mucous anæsthesia, are not cases of 'essential' neuralgia ; (3) When facial neuralgia, previously to any intervention, presents associated signs of stimulation or paralysis of other cranial nerves, such, for instance, as trismus, diplopia, facial paralysis, lingual hemiatrophy, etc., it is not a case of so-called 'essential' facial neuralgia ; (4) A case which, *ab initio*, involves the three branches of the trifacial, is not a case of 'essential' facial neuralgia.

In these cases we are dealing either with secondary facial neuralgia of exo- or endocranial origin, e.g., syphilis, tuberculosis, cancer, abscess, sinusitis, etc. In these the injection of alcohol, far from affording relief, may, on the contrary, aggravate matters. Nor is it of service in neuralgia following herpes zoster of the trifacial, for this is not a peripheral lesion.

Results.—The results, says the writer, are really remarkable in all cases of true 'essential' facial neuralgia. Success is certain when the alcohol has really destroyed the branches or nerve trunks responsible for the pain. Out of several hundred patients thus treated I only remember two in which, after perfect regional anæsthesia, the pain persisted. One of these patients has since been operated upon surgically, but still without success. The more familiar we become with the method the greater is the measure of success that follows our intervention ; in fact, the only possible cause of failure is the inability of the operator to reach the nerve trunk with his needle. In such case it is not the method but the operator that is at fault. As a general rule relapses occur in a year or eighteen months. However, they are amenable to the same operation, and the subsequent cure will probably be of somewhat longer duration. His statistics include 22 patients, who remained cured for from ten to fourteen years.

REFERENCES—¹*Lancet*, 1918, July 6 ; ²*Med. Press*, 1918, 60.

P. Watson-Williams, M.D.

Tic Douloureux Treated by the Avulsion Method of Laplace.—Curtis¹ records the following case. Female, age 61, first suffered from pain in the supra-orbital branch of the trigeminus seven years ago. Later the infra-orbital branch became affected, but never the inferior maxillary. For days the patient had to go without food or drink because the contact of a tumbler or opening the mouth brought on a paroxysm of such frightful pain that she was "absolutely unable to endure it." Curtis had to introduce a small catheter through the nose and inject a pint of milk into the stomach. In May, 1915, alcohol injections were made in the region of the Gasserian ganglion. These did no good, and a removal of the ganglion was contemplated. Curtis, however, placed the patient under the care of Laplace, whose method of operating he describes as follows: The superciliary ridge and the superior maxillary region were cleansed, and painted with iodine. A crescentic incision was made just below the border of the orbit, and the infra-orbital nerve exposed at the exit from the infra-orbital foramen and freed, in order to allow a long-bladed hæmostatic forceps to pick it up. After engaging the nerve and freeing it from the artery, the forceps was firmly held and rotated in the manner of a corkscrew from left to right. After one complete rotation, very slowly made, the minute branches of the nerve could be seen as a white filamentous tree on the upper lip and region of the alæ of the nose, the face being very congested from the anæsthetic. One or two minutes were allowed to elapse between every slow rotation of the forceps, and the nerve wound round the instrument from the central and distal extremities. About four and a half revolutions of the forceps were necessary before the nerve was wrapped

on the forceps, freed in its entirety. Laplace then unwound the nerve under water in a glass dish and laid it out on a dark background to be sure that every filament was intact. The avulsion of the superior orbital branch was carried out in the same manner. The incisions healed in a few days. Since the operation the patient has not had a twinge of pain in her face, and has gained 20 lb. in weight.

REFERENCE.—¹*Laryngoscope*, 1917, Dec., 891.

W. I. de C. Wheeler, F.R.C.S.I.

Frazier¹ believes there are no grounds for discussing any method of treatment other than alcoholic injections or the avulsion of the sensory root. By the time the surgeon is consulted, all the useless remedies have been tried and have failed, and what reserve of morale or funds the patient may have stored up has, in many instances, been exhausted. He does not think that in the major type of cases good will follow drainage of a sinus, removal of an infected tooth, or intranasal operations. The alcoholic injection has only a transitory effect, and in early cases will remove the pain for about nine months. When relapse occurs after three or four injections in so many years, the patient early pleads for a radical operation; in old-standing cases there is no other acceptable treatment.

Frazier does not discuss the details of alcoholic injection. The technique of

the latter is described in the MEDICAL ANNUAL, 1909, 1910, and 1914 by Purves Stewart. The needle can be made to reach the foramen ovale along a line running between $2\frac{1}{2}$ and 3 cm. in front of the osseous external auditory meatus, below the arch of the zygoma. The foramen is about 4 cm. from the surface. To reach the second division of the nerve at the foramen rotundum, the needle is entered immediately below the zygomatic maxillary suture, pushed backwards and inwards for a distance of 4.5 to 5.5 cm., and then the point is turned backwards to reach the mouth of the foramen rotundum. The Gasserian ganglion itself can be injected, with some risk of ulceration of the cornea, just as after the excision of the ganglion. One to 2 c.c. of an 80 per cent alcohol solution,

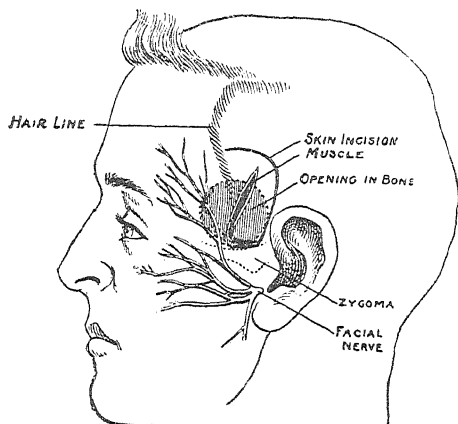


Fig. 104.—Relations of incision to the upper branch of the facial nerve. It is most important that the upper branch of the facial nerve be conserved; otherwise disastrous results might follow from the inability of the patient to close the eyelids. The old-fashioned horseshoe incision assured no protection to this branch.

to which a little cocaine may be added, is the average strength and quantity required in treating trifacial neuralgia by injection. For those without experience, it is best that the patient should be under a general anæsthetic, and that a skull should be close at hand, so that the operator may have a picture before him of what he intends to accomplish. The operative technique is excellently described in Binnie's *Operative Surgery*, 7th edition.

Frazier recommends avulsion of the sensory root as the radical procedure. The patient is operated upon in the sitting posture. The incision should approach from the middle of the zygoma, the skull is opened with a Hudson

drill, and the opening enlarged with forceps. The dura is separated from the base of the skull and surrounding bone, and the middle meningeal artery divided. The foramen ovale is recognized, and at the apex of the petrous bone the sensory root is sought. This is picked up with a special hook, and severed by gentle traction from its central attachment. Goggles should be worn for about a year to avoid corneal complications.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1918, i, 1345.

NEURITIS AND NEURALGIA.

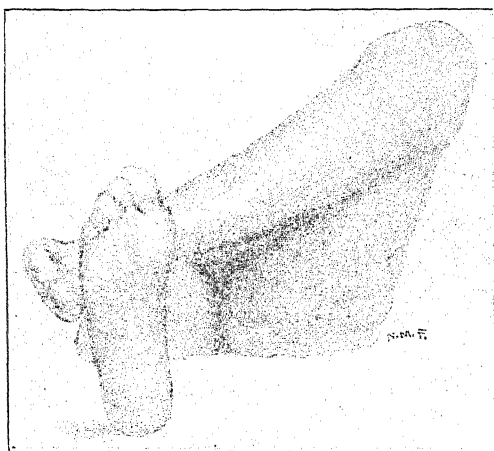
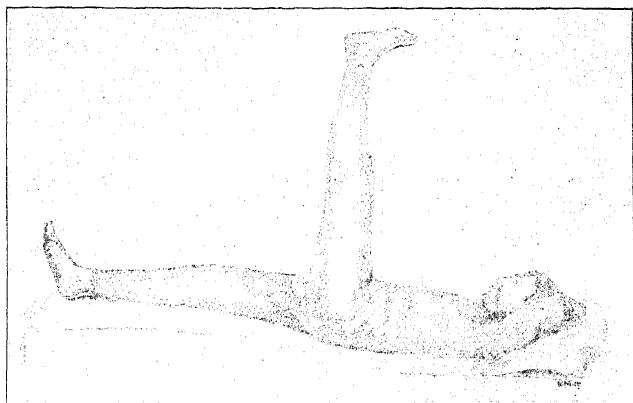
J. Ramsay Hunt, M.D.

Sciatic Neuritis—Brachial Neuritis.—Pain in one of the extremities is of frequent occurrence, and may be due to a variety of causes. It may arise from affections of the joints; from neuritis, disease of the spinal column, spinal cord, or nerve roots; and many other types of lesions, e.g., cervical rib, neoplasm, and bursitis. Therefore the correct interpretation of any pain in the arm or leg can only be given after careful examination and analysis.

H. T. Patrick¹ reviews this question, and makes the interesting statement that of all cases referred to him as brachial neuritis, only 1 in 10 proved to be true examples of this affection. By far the larger number (8 in 10) were cases of arthritis of the shoulder-joint, and the remaining tenth consisted of such affections as cervical rib, bursitis, tumour, post-herpetic neuralgia, and caries. Neuritis is characterized by a more diffuse and severe form of pain in the distribution of the nerve trunks, and these are usually quite tender on pressure. Certain sensory symptoms, e.g., hyperæsthesia, paresthetic disturbance, and even loss of sensation, may occur in severer forms. In arthritis, fixation of the joint is an important symptom, and pain is localized, and increased by movements of the joint, especially internal rotation. Arthritic atrophy of the deltoid muscle usually develops. It is not uncommon to find some secondary involvement of the nerve trunks in arthritis, and both neural and arthritic structures may be simultaneously affected. Patrick finds that arthritis of the hip-joint and sciatica are likewise not infrequently confused, and that cases of arthritis are regarded as sciatica. He lays great stress on Lasègue's sign as a diagnostic symptom of sciatica. The extremity may be moved freely in all directions, but any attempt to extend the leg with the thigh flexed causes severe pain by exerting traction upon the sciatic nerve. He states that there is a sign which is never present in sciatica and which, in his experience, is pathognomonic of arthritis; it is obtained in the following manner: With the patient supine on a level surface, the thigh is flexed, and then the external malleolus or ankle is placed above the patella of the opposite extended leg. In bad cases even this manœuvre cannot be executed without pain, but many patients do it easily. If, however, the knee is now depressed, the ankle maintaining its position above the opposite knee, the patient will complain of pain before the knee reaches the level easily attained in normal persons (*see Figs.* 105, 106). This procedure, as it involves flexion, abduction, external rotation, and extension, he would term the *fabere sign*, and in his hands has proved a valuable method of detecting obscure forms of arthritis.

The diagnosis of sciatica is not infrequently attended with considerable difficulty, especially in the earlier stages before marked objective symptoms have developed, and in milder cases. Roccavilla² has recently investigated this subject, and has found the following signs helpful where the classical symptoms are absent or not fully developed: (1) Painful hypersensitiveness in the testicle of the affected side. (2) Sacrococcygeal tenderness by digitorectal examination. (3) Diminution of electrical resistance in the limb. Each leg is successively immersed to the same level in a bath connected with one electrode, the other electrode being in contact with the limb under examina-

tion. The difference between the resistance of the affected and the healthy limb may be as much as 5 to 6 ma. (4) Popliteal hypo-reflectivity, elicited by striking with a percussion hammer the tendons of the semitendinosus and semimembranosus muscles on one side, and those of the biceps femoris on the other, about two inches above the mid-horizontal line of the popliteal space. (5) Dissociation between the idiomuscular contractility of the gastrocnemii



Figs. 105 and 106.—Patrick's test for arthritis—the 'fabere' sign

and the Achilles tendon reflex. This sign is evidenced by a hypo-excitability of the Achilles reflex and a hyper-excitability of the idiomuscular contractions of the gastrocnemii.

TREATMENT.—I. Strauss,³ in an analysis of 91 cases, recommends the injection methods of Lange and Cathelin in the treatment of obstinate cases. The technique of **Injection of Physiological Salt Solution** in the neighbourhood of the nerve (*Lange's method*) is carried out as follows: The patient lies on the

abdomen with a pillow underneath its lower part, and the feet projecting beyond the edge of the table or couch. A line is then drawn from the sacro-coccygeal articulation to the lowest point of the postero-external border of the great trochanter. The point of puncture is 1 in. to the outer side of the junction of the inner one-third and outer two-thirds of the foregoing lines. A trocar and cannula about 20 cm. in length and 2 mm. in calibre is used in the injection. The point of the trocar ought not to project very far beyond the cannula. The needle is inserted directly downward through the gluteal muscles until the nerve is reached. When the nerve is touched, the patient feels a sharp, shooting pain down the leg, and there is very often involuntary contraction of the gastrocnemius muscles. When the nerve is struck, the trocar is immediately withdrawn, and a syringe attached to the cannula. Physiological sodium chloride solution is then injected, in amounts varying from 100 to 150 c.c. Considerable pressure is sometimes necessary in order to force the fluid into the tissues, and in such cases care must be taken that the needle is not forced into the nerve. Considerable pain may follow the injection, but this, as a rule, subsides after an hour. It may be necessary to repeat the injection every other day until at least five are given, but as a rule three suffice. Alcohol should never be used for these injections.

In the *Cathelin method*, the needle is to be inserted to a depth of 6 cm. to reach the second sacral vertebra. There is no danger of entering the subarachnoid space, because the dura ends at about the level of the first sacral vertebra; however, to be certain that this space has not been entered, it is well to wait for a few minutes before injecting to see whether there is an escape of cerebrospinal fluid. If possible, when inserting the needle, one should place the patient in the knee-chest position in order more easily to locate the landmarks. If the injection is made with the patient lying on the side with the knees and thighs flexed, the landmarks are not so easily discerned, and the gluteal fold usually lies above the foramen. It may be difficult, if not impossible, to enter the epidural space of very stout persons, especially of stout women. In such cases, recourse must be had to the nerve injection.

If the skin and tissue overlying the foramen and the ligament are anæsthetized with novocain, one should be careful not to cause swelling, which might obliterate the landmarks. After the needle has been pushed through the skin, considerable resistance is met at the ligament. Once this resistance is overcome, the needle glides into the epidural space. If the patient is in the knee-chest posture, the needle is inserted into the body at an angle of 45°. After it has passed through the ligament the needle is held so that it is horizontal to the body. During the injection the patient lies on the affected side.

The injection consists of warm sterile physiological sodium chloride solution. To the first 10 or 20 c.c. of solution is added 0.125 grm. of **Novocain** with **Epinephrin**, and a few minutes are allowed to elapse after their injection to obtain the full benefit of their anæsthetic effect. In all, from 60 to 80 c.c. of solution are injected at a time.

The injections are given at forty-eight-hour intervals. They may be given in the office, and the patient will have no difficulty in going home. It is preferable, however, for the patient to remain in bed during the intervals. The average number of injections required is three. Occasionally it may be necessary to give five, but sometimes two or even one suffice to relieve the condition.

Cetrangolo⁴ has obtained good results from the subcutaneous **Injection of Oxygen** in the treatment of sciatica and other forms of neuralgia.

Vertebral Funiculitis.—J. A. Sicard⁵ introduces an interesting conception in the pathology of the peripheral nervous system. He calls attention to the special anatomical relationship of many peripheral nerves to bony canals,

and their passage through openings in ligamentous and aponeurotic structures. Such areas represent a danger zone in the pathology of any given nerve, and predispose this section of the nerve to compression and injury. For this large group of cases he proposes the generic term *neurodocitis*, which indicates an inflammatory relationship to the canal or opening in bone, tendon, or fascia through which the nerve passes. This mechanism may be observed in the cranial nerves as they traverse the bony foramina at the base of the skull,

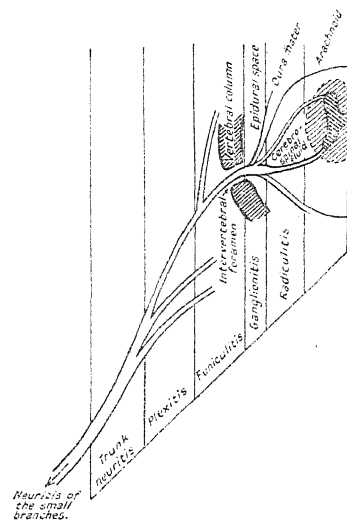


Fig. 107.—The different stages of nerve conduction from the marrow to the periphery. The ordinary sciatica is a funiculitis of the intervertebral foramen (Redrawn from *La Presse Médicale*.)

and is especially apparent in the facial nerve in its course through the Fallopian aqueduct. It is also demonstrable in the ulnar nerve in the groove of the olecranon and beneath the anterior annular ligament, and is especially applicable to the sciatic nerve in its passage through the pelvic bones and the intervertebral foramina.

For this special localization in the intervertebral foramina, Sicard proposes the term *funiculitis*, in contradistinction to radiculitis, as described by Dejerine and his school. According to this conception, funiculitis is an inflammation of the nerve trunks in their extrameningeal course, between the ganglion and the plexus (see Fig. 107). This section of the nerve trunk lies outside of the cerebro-spinal fluid. He believes that the larger number of cases described as radiculitis really belong to this type; a view which is supported by the unilaterality of the symptoms, the muscular rigidity, and the absence of lymphocytosis in the cerebro-spinal fluid. There is, however, not infrequently an increase of albumin, and

this, without hypercytosis, is of value as a diagnostic sign. Sciatic neuritis then resolves itself into a funiculitis at the 3, 4, 5 L. and 1 S. levels; lumbago is a funiculitis of the 2, 3, and 4 L. nerve roots. One has to consider therefore the possibility of radiculitis, funiculitis, plexitis, and neuritis, all of which forms Sicard believes may be clinically differentiated.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1917, 2176; ²*Riforma Méd.*, 1918, Feb. 23 (abst. *Lancet*, 1918, 610); ³*Jour. Amer. Med. Assoc.* 1917, 2032; ⁴*Semana Médica*, xxiv. 643 (abst. *Jour. Amer. Med. Assoc.*, 1917, 856; ⁵*Presse Méd.*, 1917, 620.

NEUROFIBROMATA OF SPINAL CORD.

Ionic Medication found successful (p. 23).

NEUROPATHIC AFFECTIONS OF JOINTS. (See JOINTS.)

NEUROSES OF WAR.

Maurice Nicoll, M.B., B.C.

Both in civilian life and in war a neurosis is the expression of a failure of adaptation. The failure of adaptation causes manifestations to appear, mainly either in the somatic sphere (conversion states), or in the psychical sphere (anxiety states). Intermediate forms exist.

Initially, the demand for a new adaptation, such as life in the trenches, produces in most men some degree of mental conflict. In non-neurotic types—

that is, in those who have hitherto made the ordinary adaptations in life without undue difficulty—the conflict is soon solved and the circumstances of the new environment are accepted: the war adaptation is made. In neurotic types the conflict is not so easily overcome, so that only a partial adaptation (and often no adaptation at all) is made. Failure in such an adaptation is not a sign of mental inferiority. The trouble with most neurotics is that they approach life from a too individualistic standpoint, and do not readily merge themselves with the so-called herd movements. A neurotic, unable to fight in the present war, might fight heroically for ideals that were not necessarily national; or he might solve his conflict and fight in the trenches, for individual reasons, and not because he had identified himself with the herd emotions.

In every war neurotic some degree of conflict precedes the onset of neurosis. In the anxiety states the persistence of the conflict is not difficult to detect; but in the conversion states, where there is a definite objective palsy, the persistence of the conflict is not so evident. This is because a temporary solution has been attained through the neurosis, the psychical distress being relieved, partly or wholly, by the conversion. If the question is asked why some develop anxiety states and others conversion states, in the face of the same intolerable situation, the answer must be based on broad general considerations of types. McCurdy has given evidence to show that those men who have entertained the idea of getting wounded so as to get out of the battle zone, tend to develop conversion neuroses (the palsy being the neurotic fulfilment of the wish), whereas those who have longed for death as a release, tend to develop anxiety neuroses. It must be remembered that psychical conflict in some people remains at an emotional level, with little or no mental content; while in others it becomes essentially an inward war of ideas, though primarily based on feelings. I believe that the more mental the conflict, the more it takes the form of ideals that can be expressed in words, the less able is the individual to convert it into a somatic manifestation, and the more likely is he to develop an anxiety state.

In the clinical examination, before diagnosis of a neurosis can be made, two preliminary questions invariably present themselves: (1) Is this simply a *fatigue* state? (2) Does the element of *concussion* enter into this case? The connection between the organic and the functional is very intimate, and in many cases both factors contribute to the general breakdown. If a man is suffering from definite commotion or from pure fatigue, it is clear that therapy of a psychological nature alone will be a mistaken policy. A brief study is therefore necessary of those conditions which occur from fatigue and concussion, before the real neuroses are considered.

Fatigue which arises from physical conditions such as exposure, and lack of food and sleep, is easily removed by rest and feeding. But fatigue arising from such conditions makes the war-adaptation more difficult to keep up, and may be the starting-point of that inner struggle which is termed *mental conflict*. All mental conflict is exhausting, as it means that the individual is divided against himself. Thus we are at once faced by a difficulty that arises throughout the subject of war neuroses—the intimate reaction of body and mind, and the vicious psycho-physiological circles that are exhibited when one or the other is affected. Fatigue, therefore, may be of physical and psychical origin. A man who has never reconciled himself to war or to the idea of being a pawn in the game will be in a constant state of conflict while in the trenches, and this will exhaust him rapidly, and produce fatigue. The origin of his conflict may be in other directions. He may be reconciled to war, but may hate his particular job, or have a grievance against a superior officer. Or his conflict may be more definitely neurotic, and he may dread closed spaces, such

as dug-outs (claustrophobia), or have a horror of vermin, etc. Conflicts of this kind cause an internal strain that renders him more liable to exhaustion from ordinary war conditions than a normally adjusted soldier. A whole battalion may have a particular grievance which will weaken the war adaptation and make fatigue more possible. The good officer aims at preventing his men from having any unnecessary psychological conflict.

Indications of Fatigue.—When fatigue arises there is jumpiness, anti-social behaviour, a sense of tension, loss of the most recent adaptations (such as the ability to distinguish the direction of shells), and trouble in getting to sleep owing to the rising activity of phantasy. The dream life is more active than usual, and the *occupational* dream may appear. The occupational dream is characteristic of fatigue both in war and in civilian life. The soldier is vexed by dreams concerning his daily work, in which he cannot get things done for some tantalizing reason. While falling asleep his mind is filled with visions of the daily scene, which find a variable degree of projection, sometimes being hallucinations. In this state anxiety and fear are not very prominent, and during the daytime the individual may carry on fairly well, but with increasing effort. Such a condition is not a neurosis, but it contains all the potentialities of a neurosis. If some very severe strain is put upon an individual in such a state, or if he gets concussed or buried, his adaptation breaks and a neurosis may result; but if he gets a period of rest before the last straw is laid on his back, he will recover, as a rule, without any special treatment. Still, it must be remembered that such conditions are weakening experiences and signal a dangerous degree of strain.

Diagnosis.—For practical therapeutic purposes a diagnosis must be made between fatigue states and the existence of a neurosis. Individuals suffering from fatigue states tend to spontaneous recovery when they have sufficient rest and feeding. Those suffering from neuroses do not. Diagnostic points really concern themselves with the question of degree. In fatigue: (1) There is an increasing difficulty in turning the attention effectively to the environment. This is probably the first degree of that condition seen in anxiety neuroses which is called *stupor*, when the environment is totally neglected for the inner phantasy. The capacity for effective attention is always an expression of the degree of inner psychological freedom. (2) The hypnagogic (sleepening) hallucinations are not accompanied by an intense affect (emotion) of fear, as in true anxiety states. (3) The affect in the dream life is one of distress and vexation, whereas in the anxiety neuroses it is one of abject terror (true nightmare). (4) There is no true amnesia, but a general weakening of memory. (5) There are no total conversion phenomena (palsies), but there may be stammering and tremor, or cardiac irregularities. In other words, there may be disturbance of function, but no total abolition of function. (6) The pre-war history should be considered in relation to the case. Excessive fear of darkness, thunderstorms, etc., with shyness, aloofness, dislike of ordinary amusements, are points to be noted, and, if found, suggest that inherent difficulty in adaptation which characterizes neurotics.

Concussion.—A history of a period of unconsciousness is usually obtained. Unfortunately the patient's own account cannot always be relied on in this respect, for a period of stupor, following profound emotional trauma (such as that caused by a horrible sight), with amnesia, may afterwards be described as unconsciousness. If the patient is seen during the stage of unconsciousness, the diagnosis is not difficult. In the unconsciousness following true concussion or commotio, the face is often swollen, the normal deep reflexes may be temporarily abolished, and an extensor plantar reflex obtained; the pupils are usually unequal, and the light reflex is feeble or absent; there is great

muscular relaxation. The patient cannot be roused. Retinal hæmorrhages may be seen. Lumbar puncture may show blood in the cerebrospinal fluid, the albumin content may be increased, and the fluid may be under considerable pressure. Retention of urine in the early stage is common. In those who die, minute hæmorrhages throughout the brain are described. Recovery of consciousness is not sudden and complete: there is a fitful waking, with frequent dipping into unconsciousness. *Delirium* follows, the content of which is the occupational type—that is, it is concerned with the patient's most anxious daily concerns. The patient can be roused with effort, but relapses into the hallucinatory state easily.

After the period of delirium is passed, the patient is very helpless and weak. There is amnesia, and defective orientation. The voice is monotonous, often high-pitched, and speech is laboured, and the uptake is slow. Towards night a mildly delirious state may recur for some time, but this should progressively clear up if the case is one of uncomplicated concussion. If any part of the body has been especially subjected to the force of the explosion, local signs of concussion will be found (even without any external bruising): e.g. occipital concussion produces photophobia and defective vision; spinal concussion produces transient flaccid palsy followed by spastic paraparesis, which gradually clears up; or the spinal roots may be affected and local pains develop over root distributions.

TREATMENT: *Early Stages.*—For pure concussion **Rest in Bed** is essential, in a darkened and quiet room. A night-light is often useful. For sleeplessness, **Medinal** gr. 10 or **Dial** gr. 3 may be tried, with or without the addition of **Aspirin** gr. 10. It must be remembered that the patient imagines in his hallucinatory state that he is back in the trenches, and that suggestions of security, constantly repeated, often calm him. With urging, the patient gains insight into his condition. **Hyoscine Hydrobromate** gr. $\frac{1}{16}$ hypodermically is useful in restless patients. Alcohol should not be given. It may be necessary to administer **Chloroform** in very noisy, restless cases, and this, followed by a hypodermic of **Morphia**, often gives a long period of sleep, with subsequent improvement. **Morphia** or any opium derivative is not advisable in any case where the phantasy life is predominant, as it increases the phantasy activity; but if given *after* the phantasy level is abolished (as by chloroform), it is useful.

Later Course of Concussion Patients.—(1) The condition may gradually pass off with rest. (Amnesia may persist, and there may be some permanent deterioration.) (2) The condition may clear up to a certain point, but headaches and low mental tension persist. In such cases, where there is a history of head trauma, local trouble must be considered (contusion of meninges with low inflammatory reaction, meningitis circumscripta serosa, possible fracture of inner table, etc.), and if there is local tenderness, trephining should be advised if symptoms persist unchanged after six months. The improvement may then be remarkable. Bone-grafting can be done later if necessary. (3) The condition of concussion passes away and uncovers either an anxiety state or a conversion state.

Conversion Neuroses.—The conception of conversion arose out of the modern theories concerning the modes of defence of the ego from intolerable situations. In certain people a psycho-physiological peculiarity seems to exist, whereby unbearable psychic tension (affect) is converted or transferred into the soma, leading to release of tension and a concomitant loss of function (movement, speech, hearing, feeling, co-ordination). Total conversion on to the visceral domain of function does not occur, presumably because this would lead easily to death; but disturbance of visceral function is common, more especially

in the anxiety states, which particularly reflect themselves into the cardiac innervation.

Onset of Conversion State.—The onset may be associated with a moment of extreme emotion, especially in cases of partial burial due to the effects of an explosion. It would seem that the emotions called into existence by the experience of being slowly crushed to death, partially asphyxiated or immobilized, as in a fall of earth, or telescoping of railway carriages, are amongst the most powerful of all the affects of fear. On the other hand, conversion phenomena often appear when the man is out of the line. In such cases, it must be remembered that conflict may arise of a sharper kind than when in the trenches, as thoughts of home, the horrors of trench-life seen in retrospect, and the dread of having to return, will all enter into the field. It is natural that when a man is removed from the trenches for any reason, and sent to hospital, he tends to undergo an inner change of attitude, as a way of escape opens out before him. His conflict may then become keener, psychic tension rises, and conversion may occur.

In many cases conversion phenomena supervene upon a primary organic condition. A paralysis due to concussion, or actual direct trauma, may be complicated by functional disability of psychogenic origin. Cases of slight head wounds, with transient paresis, may develop into conversion palsies. Peripheral palsies also frequently show a functional overlap. The organic disability opens a road to a psychical reinforcement of the condition. Babinski holds that suggestion is the main factor at work, while Dejerine believes that emotion, or psychic tension, is the essential cause. It is not unlikely that both factors are operative at different times, but sudden conversion states, produced under great emotional tension, seem to indicate that suggestion alone is an inadequate explanation. Suggestion, unconscious or otherwise, probably determines the path taken by the affect undergoing conversion. The objective indications of the conversion states met with in war are mutism, deaf-mutism, aphasia, contractures, paralyses, and astasia-abasias. Mutism is said to be a relic of stupor in nearly every case, according to Myers, but this is doubted by other observers.

TREATMENT OF CONVERSION STATES.—Early treatment is imperative, and the first interview with the patient is of great importance. The physician must be certain that he is dealing with a conversion state and not with an organic palsy, for in the practice of psycho-therapy the physician unconsciously communicates his real opinions to the patient. All conversion states tend to fixation, because they become (more or less unconsciously) of value to the patient as *defences* against returning to the front. A cure of this objective condition is urgent, before the secondary motive gains sufficient strength to keep up the conversion. The old-fashioned methods of rest in bed, isolation, balneology, massage, etc., for the treatment of essentially neurotic states, are now recognized as inadequate. The mental attitude of the patient with a conversion palsy has to be altered to effect a cure, and the best instruments the physician has at his disposal for this purpose are his own personality and intelligence. The physician *must* take the trouble to get into contact with the patient's mind and establish a favourable *rapproch* with him. His next step is to decide whether (1) direct hypnotic suggestion, (2) suggestion in the waking state, (3) the appeal to reason, by explanation of the condition, or (4) trick methods, are the best. As regards trick methods, these depend on the ingenuity of the physician, the aim being to demonstrate in a convincing way to the patient that he is not permanently incapacitated. Trick methods ultimately depend on the appeal to reason. A patient with functional deafness, for example, is made to stand before a mirror and the hands are clapped

suddenly behind his back. If he starts, then the psychological moment must be made the most of. Broadly speaking, the physician who is successful in curing the objective manifestations of conversion states is not so good at treating the anxiety states, and vice versa.

If, as is usual, the sum-total of the deeper attitudes of the patient's mind is towards getting cured, any method that shows him the way, or gives him an excuse, will be effective. But if the functional palsy has many deep motives behind it that are antagonistic to recovery, it may be necessary to make them fully conscious by analysis before a cure results.

After-course.—When the conversion phenomena are cured, a mild anxiety state may be substituted. The affect reappears in the psychical field, and the patient, free from bad dreams during the period of conversion, becomes subject to some degree of nightmare. This does not happen in all cases, but when it does occur, special attention must be paid to it, as it indicates that a relapse is to be expected. The curing of the conversion phenomena is *not* a curing of the capacity to convert, and exposure to the conditions of war may again bring about somatic conversion once the psychic tension becomes unbearable. The patient can only cure himself of his tendency to convert by gaining insight into the deeper processes of his mind, and for this some form of psychological analysis is necessary which aims at giving the patient self-knowledge.

The Anxiety Neuroses.—Beginning with mental conflict, owing to a failure of adaptation to war, fatigue develops increasingly until some event precipitates a true anxiety state. The last straw, in such cases, may be some harrowing experience such as the sight of a man blown to bits, or of an aeroplane falling in flames, or the near explosion of a shell, or the peculiarly terrible sensation of being buried alive by a fall of earth.

Stupor, of varying degree, may usher in the neurosis. In such cases there is complete regression from reality, and the attention is riveted wholly on some inner phantasy, and little, if any, contact is made with the environment. The patient may be found wandering about in an amnesic condition, unable to understand or speak; or he may lie in a collapsed state, apparently oblivious of his surroundings, unable to move, pulseless, trembling, with dilated pupils, and clammy with sweat. This dramatic picture of fear is not seen in pure concussion, uncomplicated by psychical factors, and unconsciousness in concussion is total.

The anxiety neuroses may appear more gradually without stupor, but with an increasing incapacity which is apt to become aggravated immediately the patient is taken out of the line.

Once the neurosis is established, there is a state of overwhelming anxiety, with hypnagogic hallucinations and true battle-dreams. Associated with these there may be loss of weight, vertigo, irregular heart, headaches, cephalic illusions ("the top of my head is a black gulf"), tremor, stuttering, great weakness, etc. The patient dreads evenings and nights, when the phantasy life becomes active. The hallucinations are of every kind of horror, and are often very stable. "I am lying here in my bed, and yet there, by that wall, is the Menin road, and I can see and hear the shells bursting." "Everywhere I look I see that man's face, with the blood pouring out of his mouth." They may be reproductions of an actual scene, or may show some elaboration, usually in the direction of increased gruesomeness. Often they are projections of the amnesic content, but are not recognized as such. When figures, the patient may speak to them. The *battle-dreams* in the early stages are nearly always based on an actual experience, which may repeat itself continuously night after night. There may be some elaboration, usually in the direction

of the grotesquely horrible. At the onset of the anxiety state the content of the battle-dream often does not relate to the immediate experience, but to ones that happened at a much earlier period.

Course of the Anxiety State.—This may be very prolonged. If untreated, the condition may persist for a year or two, the patient then only being fit to lead a very simple and protected existence, which is essentially an unhappy one, and 'regressing' at once when faced by any difficulty, with a temporary renewal of insomnia, battle-dreams, etc. It is impossible to say what will be the fate of such people now that the War is over, save to indicate that, when confronted by any difficult adaptation, they will be liable to plunge into the neurosis again. It must be remembered that all depressed states contain the germ of the idea of suicide, and depression is a very marked feature in the anxiety state. Fleeting suicidal impulses are common as time goes on. Sexual impotence is the rule, and a general inability to get out even the most primitive interests on anything. If the patient has had a pre-war neurosis, it will tend to emerge gradually in course of time as the battle-content wanes.

Battle-dreams as Indications of Progress.—The course taken by the dreams is often a valuable indication of the progress of the case. As a rule, the nightmare, in the early stages, concerns itself with the repetition of some actual scene; and if there is a plot, it is one that is detrimental to the dreamer. If the content of the dream deals with the fortunes of the dreamer, he will be captured, surrounded, shelled, etc., in the early stages. As time goes on the plot may change, and the dreamer puts up a better fight, and finally begins to triumph over his enemies. This is an excellent sign. Modern psychological research goes to show that a dream is often an analogy constituted in picture-language around the inner psychological situation of the dreamer, and when the battle-dream changes in the manner outlined above, it points to a deep reaction in the patient's mind towards healing. There are other points about battle-dreams of great practical value, but these are of too technical a nature to be described in a small compass.

TREATMENT OF ANXIETY CASES.—In the early stages, when bodily exhaustion is prominent, only symptomatic treatment is possible. Rest in bed out of the range of shell-fire (many thought it best not to remove these cases from France) is essential. The question of drugs for the sleeplessness is always something of a problem, but opium is contraindicated. The usual **Hypnotics** may be tried in the early stages, but should be speedily cut down. **Suggestions** of sleep and security, repeated several times in a low monotone, are useful at night-time. A night-light burning in the room often gives the patient a sufficient sense of security to enable him to get to sleep. A **Warm Bath** given late in the evening may help matters. After a week or two, according to the state of the patient, a more particular line of treatment should be begun. In the milder cases, occupation—games, workshops, etc.—is useful. This, together with attention to general hygiene, may be sufficient to effect a great amelioration of symptoms. But such cases, if sent back to the front, relapse easily.

For the more severe cases some method of **Psychological Treatment** is necessary. Some observers hold that direct suggestion under hypnosis can cure the battle-dreams. It is apparent, however, that the battle-dreams constitute only one expression of a general condition. The war adaptation has broken down, and all those instincts, feelings, and ideas that blend together and make such an adaptation possible in human beings are dislocated. Psychological treatment, therefore, must needs be less superficial if the aim is to re-establish the patient on a sound basis and fit him for civilian life. An analysis is necessary with the object of enabling the patient to gain an insight into the inner conflicts that keep up his neurotic manifestations, and such an

analysis can only be done by a physician with some experience. The preliminary stages, however, of such an analysis may often effect a considerable improvement.

1. The first stage consists in getting as complete an account as possible of all the circumstances that led up to the breakdown. This may take some time, and during the interviews the patient will remember many emotional incidents that he had forgotten. The discharge of emotion is always beneficial. The patient should be encouraged to talk about his painful experience during the interview. To tell him to forget them is as absurd as to tell a man with a bone in his throat to keep it there.

2. When a suitable *rapport* is established, an attempt should be made to give the patient some conception of what has happened to him, so that he may realize that he is *not going mad*, that the trouble lies in himself, and that the hallucinations are projections from the deeper levels of his own mind. The explanation of the condition must depend on the patient's intelligence, but as a rule an outline of the unconscious (or subconscious, if the term is preferred) mind, the repression of painful experiences into it, the partial failure of the repression, and the reappearance of the repressed contents in the dream and in the hallucinations, can be put before him gradually, so that he can form some idea of what has happened to him. Young officers pick up such a view, as a rule, without difficulty.

3. The nature of the conflict must be made conscious to him. It cannot be too strongly impressed on those medical men who are beginning to interest themselves in psychological medicine that the majority of patients have little or no power of realizing for themselves even the most superficial sources of their conflict, though they may be patent to onlookers.

After-course.—It is doubtful if the war adaptation can ever be made again within a reasonable period, once it has broken down completely; but a civilian adaptation is possible and should be aimed at. Discharged men, who have been untreated and remain incapable of making a tolerable civilian adaptation, require to gain insight by some form of re-educative analysis into their conflicts, before a reasonable efficiency can be expected.

BIBLIOGRAPHY.—Eder, *War Shock* (1917); Freud, *Selected Papers on Hysteria* (translation, 1912); Bernard Hart, *Psychology of Insanity* (1912); E. Jones, *Psycho-analysis* (1918); Jung, *Theory of Psycho-analysis* (1915), *Analytical Psychology* (1917); MacCurdy, *War Neuroses* (1918); Nicoll, *Dream Psychology* (1917); Elliot, Smith and Pear, *Shell Shock* (1917); Trotter, *Herd Instinct* (1917). In addition to the above volumes, papers by various writers in the *Lancet*, *British Medical Journal*, *Proceedings of Royal Society of Medicine*, on war neuroses, from various standpoints, should be consulted (Brown, Fearnside, Hurst, Myers, Rivers, Ross, Aldren Turner, etc.). For abstracts of foreign authors during the war, see *Medical Supplements to Daily Review of the Foreign Press* (War Office), published by H.M. Stationery Office.

NEW-BORN, FATAL INJURIES IN. *Frederick Langmead, M.D., F.R.C.P.*

G. Hedren¹ discusses intrapartum injuries of the viscera, both from his experience and from contributions to the literature. He points out that fatal visceral injury may occur with spontaneous delivery. In his examination of 1000 bodies of newly-born infants he found two with rupture of the parenchyma of the liver—one with spontaneous and one with forcible delivery. In both cases there was breech presentation. In these, as also in numerous cases in the literature, the liver was otherwise normal, except for engorgement with blood. The child of another woman, a secundipara of 31, died six hours after delivery in vertex presentation, and necropsy revealed rupture of the spleen. In all cases in which this lesion has been found to result from delivery, the spleen was already diseased. He only knows of one case each of fatal rupture of the pancreas or kidney, but minute subscapular hæmor-

rhages in the pancreas were found comparatively often in the 1000 cadavers. He summarizes also 17 cases of fatal intrapartum injury of the intestines, 1 of hæmatoma of the cæcum, and 2 of rupture of omental vessels. In some it appeared that the rupture had occurred before delivery, in others during spontaneous delivery.

Among 1080 still-born children, he found a pronounced hæmatoma in one suprarenal gland in 8. In 4, forceps were used; in 1, version and extraction; but in the remaining 3, delivery was spontaneous. Every factor which increases venous engorgement, such as asphyxia or disturbance in breathing, increases the liability to central hæmorrhage in the suprarenals. The swinging method of artificial respiration seemed responsible in some cases, but in others the hæmorrhages had preceded the use of this device. Hedren found intracranial hæmorrhage in about 9.28 per cent of 700 infant cadavers. It was restricted to the meninges in nearly 84 per cent, but was cerebral also in others, bringing the total of meningeal hæmorrhages to 99.7 per cent. Delivery had been spontaneous in 50 out of 65 cases, and the conditions in mother and child seemed to be normal in most instances. In the 42 purely meningeal cases, the hæmorrhage was supratentorial in 32, infratentorial in 10, and in both positions in 6. He ascribes great importance to intra-uterine disturbances of respiration and circulation, and also to compression of cranial bones in the birth passage. Only three of the infants showed indubitable evidence of syphilis. In a few of the cases the mother suffered from eclampsia. In 10 medico-legal cases the hæmorrhage was nearly always accompanied by signs of asphyxia, venous hyperæmia, ecchymoses, etc. He emphasizes that injury from certain external causes after birth may resemble exactly injury from birth trauma, and the latter may occur without fracture of bone.

REFERENCE.—¹*Svenska Läkaresällskapets Handlingar*. Stockholm, 1918, Mar. 30, pp. 1 and 53 (abstr. *Jour. Amer. Med. Assoc.* 1918, i, 1938).

NIGHT BLINDNESS.—(See HEMERALOPIA.)

NOSE, AFFECTIONS OF. (See also NASAL SINUSITIS; NASOPHARYNX.)

P. Watson-Williams, M.D.

Hæmorrhage from the Nose, and from the Mouth and Larynx.—Corwin¹ holds that purpura, whether simple or hæmorrhagic, is merely a symptom-complex resulting from toxæmia of a wide variety, with no single pathological foundation. In one case, which followed an acute attack of tonsillitis, the bleeding was stopped by repacking the nose with **Coagulose** on gauze and by injection of **Pituitrin** every six hours for three doses. On the second day the patient was given 20 c.c. of **Blood Serum** from his brother. This, with **Out-of-door Treatment**, **Arsenic**, and **Iron**, was followed slowly but steadily by recovery.

Nasal hæmorrhage, purpuric in character, is an incident in scurvy, phosphorus or snake-venom poisoning, the grave cachexias, leucæmia and anaemia, and bacterial infections of many kinds. The hæmophilic tendency is absent except in rare instances; in most cases they are individual bleeders, not hæmophiliacs. There is fatty degeneration of the capillary walls, but the blood frequently clots in normal time. The hæmorrhage of venous stasis is rare, though the epistaxis of pertussis is of this character. This type of hæmorrhage from throat and nose has been reported in cases of alcoholic cirrhosis, and in uncompensated mitral lesions. The varices at the base of the tongue are rarely the site of hæmorrhage, and yet their rupture may give extreme anxiety to both patient and physician unless identified.

Chloride of Calcium applied to the wound upon pledgets soaked in a 1 or 2 per cent solution is of distinct benefit in checking and preventing hæmorrhage.

Animal Serum injected into a seemingly hopeless hæmophiliac will usually save the patient. It acts equally well in many cases of purpura and other little understood hæmorrhagic types. Its prophylactic power when introduced into known bleeders will bring about a normal condition which will last for three weeks or as many months, and thereby permit surgical procedures which were otherwise impossible. Horse serum is less anaphylactic than ox serum. Blood serum, however, from one of the patient's family is preferable. Fresh normal human blood serum is obtained precisely as in making the Wassermann test. Twenty to forty cubic centimetres, repeated in eight to twenty-four hours, is a safe dose. Coagulose made from human blood serum, applied dry or in solution, has proved exceedingly reliable in epistaxis. In a large number of tonsil cases Corwin has used ampoules of Pituitrin with satisfaction. Goldstein in 1913 recommended systematic coagulation tests in every case of prospective tonsillectomy, and a serum injection when the coagulation time exceeds seven minutes.

Atrophic Rhinitis.—TREATMENT.—Ichthyol ointment has been used in two cases by Fowler² with good results in so far as it lessened the unpleasant symptoms, removing the odour and preventing the formation of crusts, and this in patients who had used salt-and-water nasal douches constantly but without much improvement. The first was a case of simple atrophic rhinitis, the second typical ozæna. The patients were directed to discontinue the use of douches, and instructed to apply on cotton thrice daily to each nostril an ointment consisting of ichthyol gr. 20, menthol gr. 2, and petrolatum 2 oz.

A method of increasing the mucosal surface of atrophic inferior turbinals has been followed in a number of cases by Griffin,³ with favourable results. The nose is anesthetized in the usual way. The mucous membrane with its submucosa of the inferior turbinate is incised from the posterior tip to the anterior tip down to the bone. The membrane is now stripped downward and allowed to drop to the floor of the nose. The turbinate is then fractured toward the septum by passing any flat long instrument, such as the ordinary blunt septal elevator, along the external surface of the bone. The nasal cavity is then packed with strips of plain gauze saturated in albolene oil, being careful to pack both on the external and internal surface of the turbinate, as packing the nasal cavity internal to this bone would only push back the fractured fragments into place. The nose is then treated as after any surgical procedure. In about seven weeks we have an entirely different looking turbinate. The triangular raw surface produced by the operation fills in with granulation tissue, and the mucous membrane grows over this area. The growth of the membrane is aided by the hyperæmia produced in the upper and lower segments of the turbinate by the incision. This surgical technique is followed in the other nostril in about two or three weeks, according to the convenience of the patient. No astringents should be employed in the dressings. Silver nitrate in 5 per cent solution can be used for exuberant granulations. This method may be employed in idiopathic atrophic rhinitis, or as a reconstructive method after destruction has already resulted from infection of the sinuses, especially the ethmoidal.

The operation, the author states, is not a panacea for all atrophic cases, and should not be resorted to until all evident causes for the atrophic condition have been removed.

The Electric Cautery in Affections of the Nose.—Hitschler⁴ remarks that harm can come of almost any therapeutic measure, and the Electric Cautery is no exception. It is, however, a most efficient weapon in the warfare against some very common nasal diseases. When too extensive an area is cauterized, and when subsequent treatment is curtailed or omitted, we may have persis-

tent crusting and adhesions. Temporary crusting always occurs and continues for a few weeks, or a couple of months at the most. In many cases it is difficult to determine, by closest inspection, whether or not the cautery has been used. This applies particularly to those cases of simple vasomotor paresis without hypertrophy. Linear cauterization practically removes the objection to crusting. There is no reasonable excuse for simultaneous cauterization of opposing surfaces. Even when done accidentally, a little care and persistence in after-treatment will prevent adhesions. Subsequent inflammatory reaction cannot be considered an argument against the use of the cautery.

Indications: (1) Vasomotor paresis of the inferior turbinated bodies giving rise to alternate, intermittent, nocturnal, or decubital nasal obstructions; (2) Chronic rhinitis characterized by a thick mucous or mucopurulent discharge; (3) Cases of reflex irritation, e.g. asthma. Cauterization is often attended by results which can only be described as brilliant.

Anatomy of the Nasal Septum.—Aymard⁵ describes some new anatomical points of importance from the surgical standpoint. Firstly, he states that the septal cartilage comprises not only the perpendicular plate, but also the so-called lateral triangular cartilages usually considered as separate structures, and he terms the complete septal cartilage the 'cartilago nasalis major,' with a lamina perpendicularis and on either side a lamina triangularis. Secondly, the perichondrium is continuous from one side of the perpendicular cartilage downwards beneath the lower border and upwards on the other side, a movable joint existing between the lower border of the cartilage above and the crista maxillaris and crista vomeris below, and it is a mistake to suppose that the perichondrium is continuous with the periosteum of the crest. Thirdly, the perichondrium is firmly attached to the cartilage, and in practice the operation on the cartilage is essentially submucous resection, and not a mucoperichondrial resection as is usually believed. Fourthly, Aymard emphasizes the desirability of the removal of only just so much cartilage or bone as will give the necessary space for free passage of air or for any other purpose, and above all, that at least a quarter of an inch of the anterior pillar of the septum should, as a rule, be left, and that the foundation of even this support should not be lightly removed by chiselling away the maxillary crest, for fear of possible ultimate cosmetic defects. Many other points of practical interest are covered by Aymard's contribution and research.

Nasal Septum Deformity in Children.—Zuckermandl has said that septal deviation did not occur before the seventh year, i.e., before the development of the jaw with the second dentition. The upper jaw in civilized man is much smaller than in his forebears. The Gothic type of palate, usual in infancy, persists more often nowadays, and there is not room for the larger teeth of the second dentition. The result is a crowding upward and buckling of the vomer and other parts of the septum. The jaw does not expand sufficiently for the palate to flatten out and leave room for the downward growth of the septum. In his examination of 314 children, Kaempfer⁶ has noticed that many had slight thickening of one or other side of the septum, and holds that it is quite probable that later on these thickenings may develop into true deviations. Two groups of children were examined. The larger group (220) was seen in the out-patient department of a hospital. The youngest child was five weeks old and the oldest seven years. One hundred and eight children (about 50 per cent) showed deformities of the septum—65 had thickening and 43 deviations. The proportion of deviations and thickenings of the septum increased as the children grew older. There were few in whom abnormal turbinates could be found. Indeed, only 12 showed hypertrophy of the lower turbinate, and 10 a similar condition of the middle turbinate. In all but one

of these children the enlargement of the turbinates was associated with thickening or deviation of the septum, and Kaempfer holds that the condition of the turbinates is the effect rather than the cause of the deviation. Almost all of the children had high arched palates; only 11 per cent had low palates. Of the 25 children with low palates, 12 had thickened septa and 1 had a deviation. Of 108 cases with septal deformity, 101 had enlarged tonsils (93 per cent). Among the children without septal deformity, only 77 per cent had hypertrophied tonsils. The second group of cases was drawn from children living in a large institution. These cases numbered 94, and ranged in age from six months to five years. They lived under excellent surroundings, spent much time out of doors, slept in well-ventilated rooms, and were guarded against errors in diet. Of these 94 children, only 38 showed abnormality of the nasal septum (24 thickening, and 14 deviations). Only one child had large turbinates. Seventy-one of the children had enlarged tonsils.

Teratoid Tumours of the Nasal Septum.—Brown Kelly⁷ describes and illustrates two examples of this rare condition, one a female, the other a male, at the age of two months. In the first there was a growth of fleshy consistence filling the right nostril and projecting $\frac{1}{4}$ in. beyond it. It was covered with skin continuous with that of the columella and upper lip. In the other, the male infant, the nose was broad and flat, the columella broad, and from the upper part of its right edge a rounded process covered with skin projected and occupied the anterior angle of the vestibule. Kelly refers to a few other reported cases, and concludes that these appendages suggest a developmental disturbance along the line of union of the fronto-nasal and lateral maxillary processes.

Choanal Polypus of the Nose.—Ewing,⁸ from investigations in thirty-five cases in Logan Turner's clinic, states that in almost all cases a prolongation of the polypus, which is really the stalk, can be traced forwards and upwards across the inferior turbinate into the posterior part of the middle meatus, external to the middle turbinate, and this stalk can be often followed up to the accessory ostium of the antrum by using a probe with the end bent into a small hook. In only one-third of the cases was there excess of secretion, and in three only was this purulent. Transillumination of the antrum was very unreliable as a test, e.g., in 21 cases, the affected side was the brighter in 8, the unaffected the brighter in 8, while in 5 the affected and unaffected sides transilluminated equally. In the 8 cases where the affected antrum was the brighter, the antrum contained a large clear or cystic polypus. Radiography, on the other hand, showed a blurring of the antral cavity on the affected side in all of the 7 in which radiograms were taken. As to the site, in 12 of the 15 cases in which the actual site of origin was recorded, the polypus was in close proximity to the accessory ostium, being from some point on the inner antral wall far back in the cavity. On the question of treatment, Ewing urges that the operation of choice is the **Radical Operation through the Canine Fossa**, which enables one to observe the site of origin and to remove the mucous membrane thoroughly at the site. But even with the radical operation, recurrence took place in a few instances.

Atresia of the Choana: a Simple Device for Prevention of Re-formation of the Obstruction after its Removal.—Brady⁹ remarks that congenital atresia of the posterior choanae may be unilateral, bilateral, partial, or complete. It may be caused by a completely bony, or a bony-membranous structure. Cases of this congenital malformation seldom come under our observation. This may be accounted for by asphyxia neonatorum being not infrequently due to this cause. The dramatic description which a mother gave of the struggle of her infant daughter for breath, shortly after birth, showed how the combat

might have ended in death. Under open ether the partitions were removed. A long folded strip of bismuth gauze—about three-quarters of an inch wide—was passed down one nostril till it was felt with the index finger in the nasopharynx. A nasal dressing-forceps was then passed down the other nostril till it caught the end of the gauze strip, which was then drawn out and the two ends of the gauze tied together across the columella. Daily the nurse sewed a fresh strip of gauze to one end of the strip in the nose, and by drawing on the opposite end of the nasal strip a fresh one took its place and was tied as before. This was kept up for two weeks.

REFERENCES.—¹*Ann. Otol. Rhinol. and Laryngol.* 1917, Sept., 749; ²*Laryngoscope*, 1917, Dec., 994; ³*Med. Rec.* 1917, ii, 723; ⁴*Ann. Otol. Rhinol. and Laryngol.* 1917, June, 519; ⁵*Jour. Laryngol. Rhinol. and Otol.* 1917, Oct., 308; ⁶*Laryngoscope*, 1917, Dec., 868; ⁷*Jour. Laryngol. Rhinol. and Otol.* 1918, July, 194; ⁸*Ibid.* Aug., 227; ⁹*Ibid.* Feb., 49.

OERBISS, OR PSEUDOMYIASE RAMPANTE.

E. Graham Little, M.D., F.R.C.P.

Blanchard¹ describes a case of this disease, which infests particularly Senegal and the Ivory Coast. The disease is characterized by the development of furrows or sub-epidermic canals filled with a serous fluid, accompanied by burning and lancinating pain of the parts affected, usually the feet. The disease has been ascribed to contact with damp earth, and the patient had been accustomed to walk in his garden with bare feet. After futile applications of various ointments, complete cure was effected by the following measures: The furrows were opened up and painted with a solution of 20 per cent Nitrate of Silver, and the lesions enclosed in a circle painted with the same solution. The furrows would extend to the limits thus marked out, but appeared to be stopped in their progress by the painted line.

REFERENCE.—¹*Bull. Soc. de Path. Exotique*, vol. x, No. 8, 725.

OPHTHALMITIS, SYMPATHETIC.

R. Foster Moore, F.R.C.S.

ETIOLOGY.—J. A. Wilson¹ puts forward some new ideas with regard to the etiology of this disease, and suggests that neurotoxic ophthalmia may perhaps correctly describe the condition. His suggestions, which appear to be worthy of thought, are somewhat as follows. Both local and general infective conditions occasionally produce uveitis. Do they effect this by acting in a selective manner on the uveal tissues? or may they not act primarily on the nervous system, and produce such changes that the normal influence of this system upon the tissues of the eye is perverted and uveitis consequently follows? A case is quoted at some length in which the sixth nerve, the ophthalmic division of the fifth, and the lenticular ganglion were simultaneously involved. The author believes that a primary nerve lesion was the cause. He says: "A central lesion, probably a toxæmia, has involved an efferent nerve and produced muscular paralysis, an afferent nerve and produced herpes, and through the lenticular ganglion has produced uveitis. . . . Nerve influence controls metabolism, and its withdrawal leads to deterioration and vulnerability. Perverted influence may lead to perverted metabolism." In tetanus the toxin travels up the nerve-sheath and produces changes in the nerve cells; in diphtheria the toxin also affects the nerve centres; in pneumonia, organic disease of the skin occurs in the form of herpes, the toxin having been conveyed to the nerve or brain by the blood-stream. "It must be admitted that central neurotoxæmias produce peripheral manifestations in various forms, and that among these is uveitis. If so, then the necessity for the presence of pathogenic organisms in the second eye may be excluded." The author states that deafness is sometimes associated with sympathetic ophthalmia, and

suggests that this may be due to the involvement of the cells of Gudden's commissure, which connects the two internal geniculate bodies by fibres which traverse the optic commissure. The author concludes that the suggestions from these observations are that in sympathetic ophthalmia—as in tetanus—toxins pass up the nerve and reach the nerve cells. In this case, from the decussation at the chiasma they reach the nerve cells of both sides of the brain, causing a central disturbance with efferent influences—as in herpes—which manifest themselves first as capillary changes and then as uveitis.

J. Meller² gives details of seven cases in which this disease developed, and concludes that the degree of inflammation reached by the exciting eye bears no relation to the severity of the affection in the second eye, and that there is no definite relation between the severity of the disease, and the interval between the removal of the eye and the outbreak of sympathetic inflammation.

In a further paper³ Meller describes the histological appearances in two severe cases. He found in the region of the ciliary body a large tumour composed of granulation tissue, small round cells with numerous foci of epithelioid and giant cells; the centre of the tumour was largely necrotic. Vascular obliteration was marked. In each optic nerve behind the globe a focus of epithelioid cells was present.

In another paper⁴ Meller gives an account of the histological findings in a sympathizing eye which was removed ten years after the injury to the exciting eye. This has an especial value from the fact that the opportunity for obtaining such eyes is so exceedingly rare. The changes found were essentially those which are seen in the exciting eye.

E. von Hippel⁵ points out the great similarity histologically between tuberculous uveitis and sympathetic uveitis, and states that it may be impossible from histological considerations alone to distinguish the one from the other.

Albert Poulard⁶ points out the infrequency of sympathetic ophthalmitis during the war, and puts forward a plea for the less radical treatment of perforating wounds of the eyeball.

Morax⁷ has collected from a number of French ophthalmic surgeons doing war surgery their experience and opinions with regard to sympathetic ophthalmitis; 39 cases have been collected. A gunshot wound was the cause of the perforation in 31 of these. Prolapse of uveal tissue was common, and in 10 cases an intra-ocular foreign body was present. In 3 of the cases the time between the injury and the onset of signs of sympathetic disease was between fifteen and twenty days; in 1 case the interval was as long as seven and a half months; he states, therefore, that excision of a wounded eye within fourteen days will prevent the disease. Morax remarks upon the large proportion of relatively benign cases.

REFERENCES.—¹*Glasgow Med. Jour.* 1918, April, 193; ²*Arch. f. Ophthal.* 1914, lxxix, pt. 1 (abstr. *Brit. Jour. Ophth.* 1918, Aug. 436); ³*Ibid.* 1915, lxxxix, pt. 2 (abstr. *Ibid.* 437); ⁴*Ibid.* 1916, lxxxix, pt. 3 (abstr. *Ibid.* 439); ⁵*Ibid.* 1917, xcii, pt. 4 (abstr. *Ibid.* 442); ⁶*Ann. d'Ocul.* 1917, Dec. (abstr. *Ibid.* 443); ⁷*Ibid.* (abstr. *Ibid.* 444).

ORTHOPÆDIC APPARATUS.

E. W. Hey Groves, M.S., F.R.C.S.
Cecil A. Joll, M.S., F.R.C.S.

Johnson and Buchanan¹ have described a set of splints which are in some particulars improvements on previous patterns. In order to support the arm for ambulatory cases where abduction is necessary, they use an aluminium bar shaped round the shoulder of the affected side and coming down to the anterior-superior spine of the other side in front, and behind to a corresponding point. The ends are then united by a semi-girdle round the same side, and riveted. (*See Plates XXXVIII, XXXIX.*)

Splint for High Fractures of the Humerus.—The apparatus just described forms the basis of this, bars being carried out from the latter to about 4 in. below the elbow, with a vertical upright added. To this a forearm support is attached and supported by a stay to the girdle band. The splint is first fixed to the forearm, the latter acting as a fulcrum. The extension is made partly from the humerus with strapping or glue, and partly from the upper third of the forearm (*Plate XXXVIII, A*). For the lower part of the humerus they use a splint which differs from the ordinary Jones in that the bars are anterior

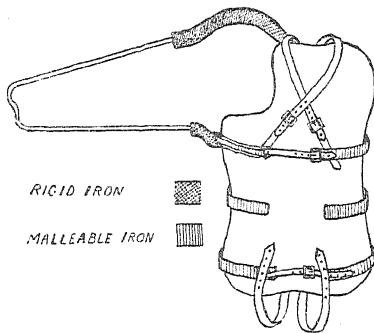


Fig. 108.—Campbell's frame splint (front view).

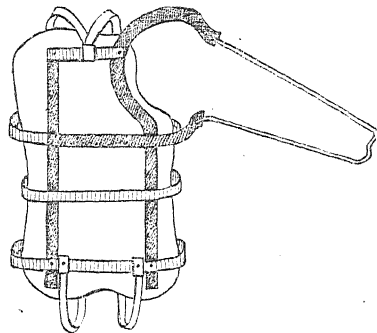


Fig. 109.—Campbell's frame splint (back view).

and posterior and not lateral, and the bars are wider apart, while more room is allowed for the extension, so that the forearm may be used as well for this purpose (*Plate XXXVIII, B*). These writers figure a modification of the Middledorf triangle which may be useful occasionally (*Plate XXXVIII, C*).

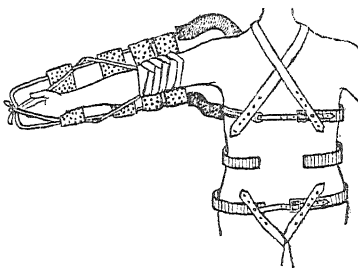


Fig. 110.—Campbell's frame splint applied.
(Kindly lent by the 'British Medical Journal'.)

Excision of the Head of the Humerus.

—For this they use the apparatus represented in *Plate XXXIX, D*, but while this appliance may give adequate abduction it does not appear to provide external rotation, which is equally important.

Elbow-joint.—*Plate XXXIX, E*, indicates the special features of this splint.

Forearm.—These authors have also devised splints for the forearm, but as they do not permit of full supination of the forearm, they do not appear to be suitable for general use.

Wrist and Hand.—Here they use a dorsiflexed ring—the latter of a pattern devised by one of us (E. W. H. G.)—so as to permit of extension being applied to the fingers, and to keep the wrist dorsiflexed (*Plate XXXIX, F*).

Watkin Williams,² very properly as we think, warns against the prolonged fixation which is so difficult to avoid with the Thomas type of splint, and he describes some splints which help to procure mobility of the normal tissues with fixation of the broken bone. In the attempt to provide such splints he has endeavoured to devise a splint which, while subserving the desiderata given above, shall yet be light and inexpensive. The main feature of the

PLATE XXXVIII.

SPLINTS FOR FRACTURE OF ARM, FOREARM, AND HAND

(JOHNSON AND BUCHANAN)

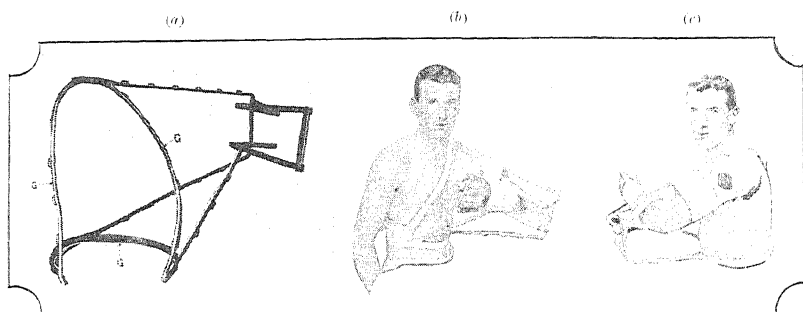


Fig. A.—Splint for high fractures of humerus. (a) The splint; note the counter-extension grip (G) and the forearm-rest. (b) The splint applied. (c) Showing shoulder exposed.

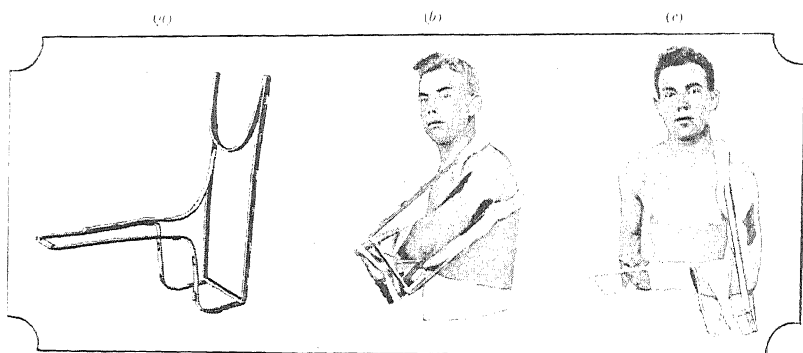


Fig. B.—Modification of the Jones angular arm splint. (a) The splint. (b) and (c) The splint applied, showing arm exposed.

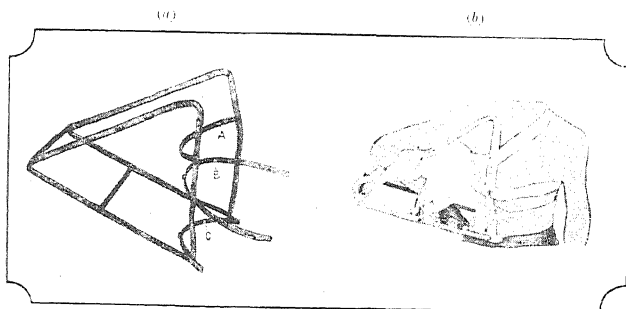


Fig. C.—Modified Middledorf splint. (a) The splint; note A, the loop below axilla; B, the loop above iliac crest; C, the loop round the trochanteric level. (b) The splint applied.

PLATE XXXIX.

SPLINTS FOR FRACTURE OF ARM, FOREARM, AND HAND—*contd.*

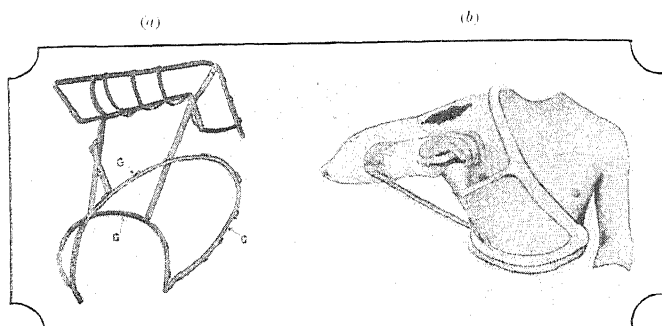


Fig. D.—Splint for excision of head of humerus. (a) The splint; note counter-extension grip, G. (b) The apparatus applied.

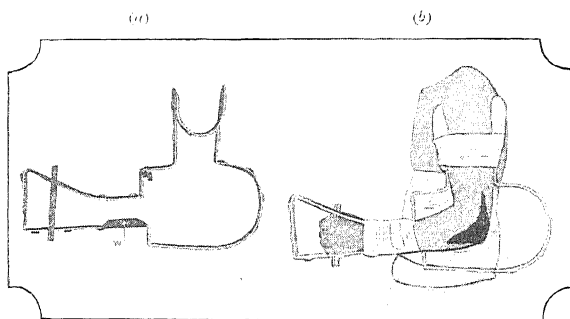


Fig. E.—Splint for elbow-joint fractures, etc. (a) The splint; note W, wrist-cup. (b) The splint applied.

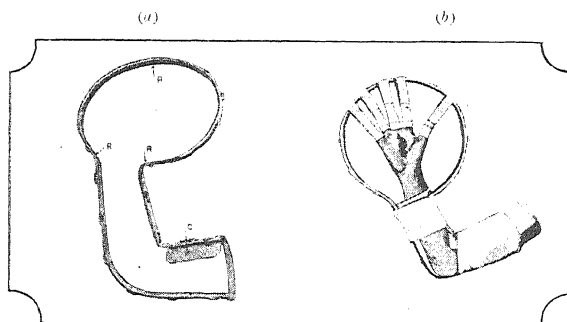


Fig. F.—Splint for wrist and hand. (a) The splint; note R, the dorsiflexed ring; c, cup for biceps. (b) The splint applied.

PLATE XL.

SEGMENTED SPLINTS FOR PROLONGED IMMOBILIZATION

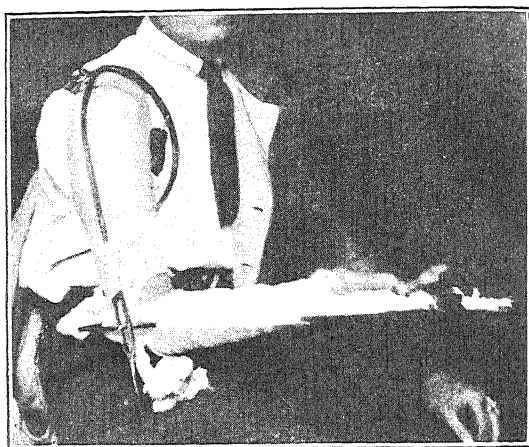


Fig. G.

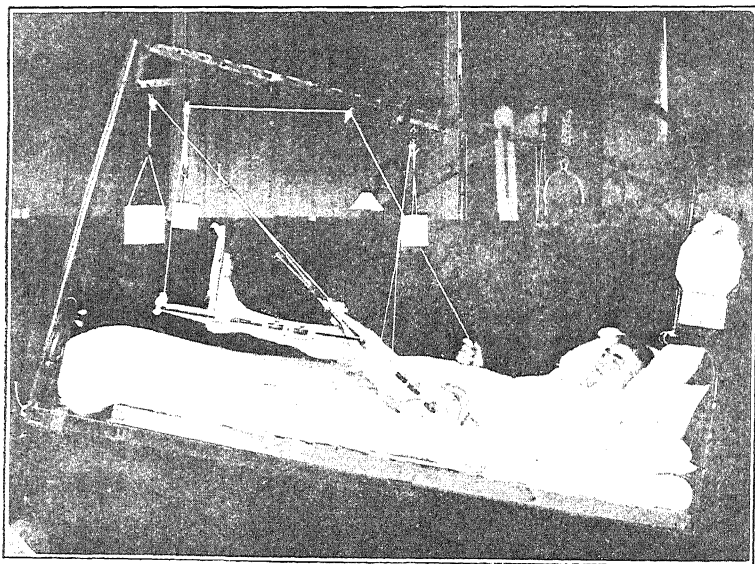


Fig. H.

Reproduced from 'The Lancet'

splints he describes is that they are made in segments, one for each segment of the limb, and that each of these limb-segments is separately extended; the two parts of the frame are then jointed together so that the limb can be moved at that level.

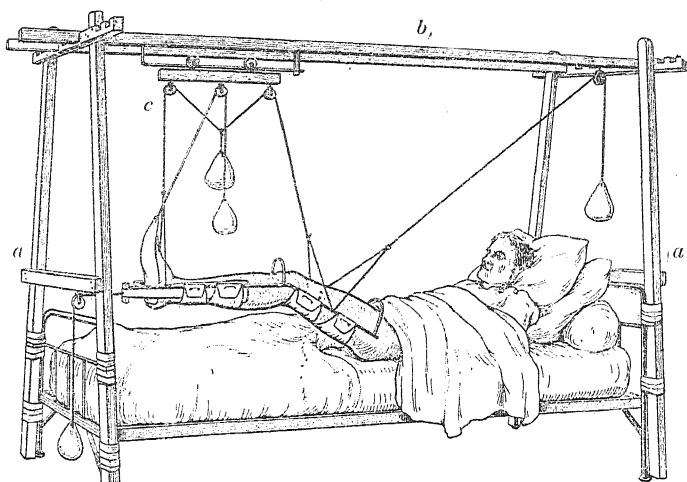


Fig. 111.—Method of suspension of fractures of the leg.

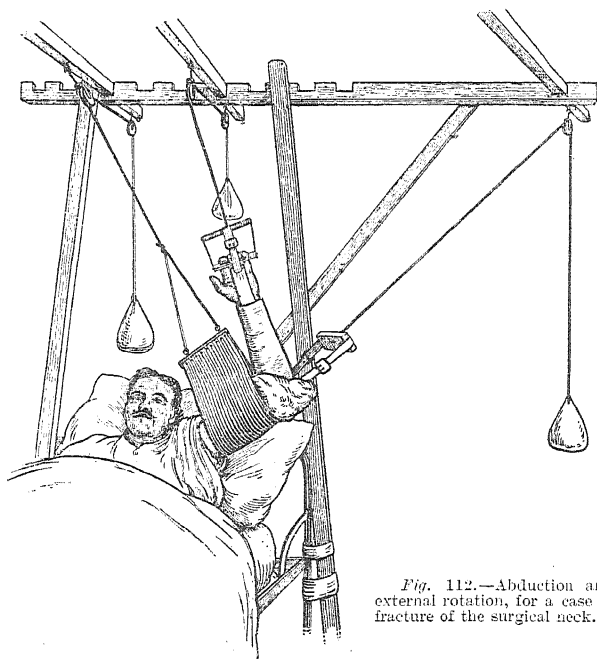


Fig. 112.—Abduction and external rotation, for a case of fracture of the surgical neck.

Upper Limb. (Plate XL, G).—There is a ring above, the anterior part of which is rigid, the axillary and posterior parts consisting of a padded rubber ring, which provides for the counter-pull to the extension bands, which are tied to the lower end of the frame. All movements of the shoulder and elbow are possible from the first, he claims.

Lower Limb. (Plate XL, H).—The thigh frame is a shortened Hodgen; the leg-piece is the lower two-thirds of a Hodgen, hinged to the former at the knee. The joint is adjustable at any position to suit all statures. Full range

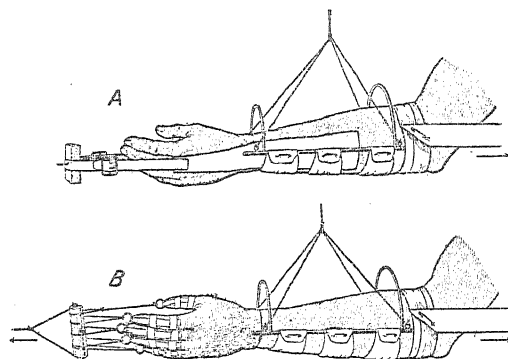


Fig. 113.—Cradle for forearm fractures. Traction is made with glued bands (A) or by a cotton glove glued on, with a perforated button at the end of each glove finger (B). Counter-extension is made with a Hennequin band.

of knee movement is possible at once, it is claimed—passively by the patient lowering and raising the counter-weight attached to the leg segment, and actively to a slight extent in all except those quite near the knee-joint. In order to allow the freest movement of the patient the limb has three counter-weights: (1) suspension of the thigh—about 10 lb., (2) suspension of the leg—about 5 lb., (3) extension of the thigh—about 15 to 25 lb. Campbell³ has devised a splint to afford abduction of the arm in cases of gunshot wounds of the shoulder-joint which appears to be efficient and has proved satisfactory to the author. It is based, he explains, on the Jones abduction frame for the lower limb, and consists of an iron frame covered with a thick, firm pad. The frame and pad are cut away in such a manner as to allow free access to the shoulder region. Three pairs of malleable iron bands running transversely, embrace the body just above the trochanters, at the level of the lower ribs and of the nipples respectively. The upper and lower bands are joined in their respective pairs by straps and buckles. On the side destined for the affected limb the uppermost malleable iron band is replaced by a rounded rod of padded stout metal, to act as a point for counter-extension. The band of the frame on this side is curved round above the shoulder and then curved forwards, and a stout bar, running transversely at the level of the uppermost malleable band, is also turned forwards in the same way. To the extremities of these rigid bars are attached the side-pieces of an ordinary Thomas arm splint, in almost complete abduction and slight forward flexion. The patient is prevented from slipping up or down in the frame by perineal and shoulder bands. The extension is applied not to the forearm but to the arm; thus the elbow can be moved daily, and the danger of stiff elbow is thereby minimized (Figs. 108–110).

Blake and Bulkley⁴ give details of their methods of treating fractures by suspension and traction. (Figs. 111–116, reproduced from 'La Presse Médicale'.)

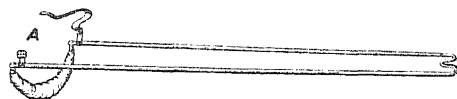


Fig. 114.—Keller's type of Thomas splint.

We give a *résumé* of the apparatus they employ, leaving the account of their actual methods to the article on FRACTURES. The apparatus for suspension (*Fig. 111*) consists of two frames, one at each end of the bed (*a a*), joined by two or more parallel bars above the bed. The frame must be placed above the bed. The longitudinal bars (*b*) are 8 ft. 10 in. long, and can be fitted into the notches of the cross-bars. Each frame has two up-rights and two cross-pieces, the upper near the top of the upright and the lower at the level of the mattress. Each upright is 6 ft. 6 in. long. The length of the cross-bars depends on the type of bed used. Each longitudinal bar is notched on

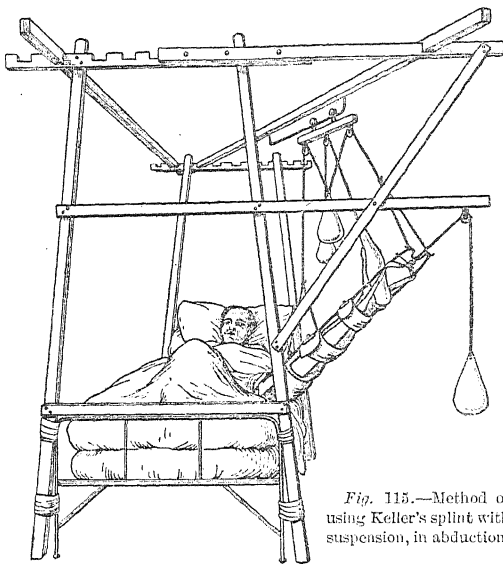


Fig. 115.—Method of using Keller's splint with suspension, in abduction.

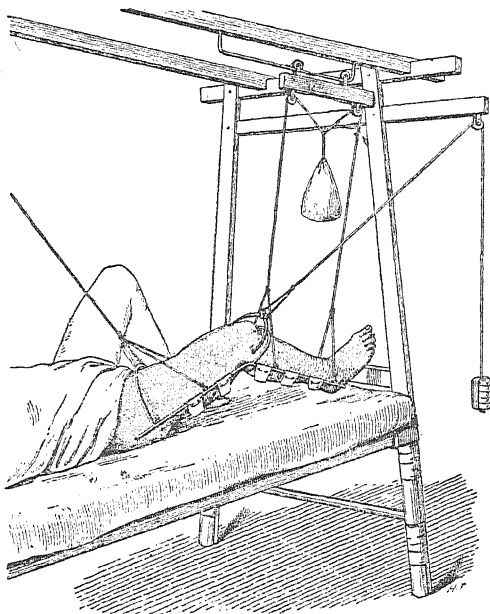


Fig. 116.—Fracture at the upper third of the femur, with extension by the so-called Steinmann pin.

its lower surface so as to fit the notches in the cross-bars and to make a snug joint. Blake and Bulkley use pine for the frame, and they find that 2 in. by 1 in. wood is strong enough except for the top cross-bar and the longitudinal bars, which must be rather thicker. For fractures of the lower limb they lay stress on the desirability of permitting mobility in the length of the bed: to make this possible they use a wooden trolley running on an iron curtain rod by means of two pulley-wheels (*Fig. 111, c*). The rod is a yard long and $\frac{3}{8}$ in. diameter; it is given a bayonet-like curve at one end, while the other fits into a hole in a right-angled piece of iron fixed to the longitu-

dinal bar. The trolley carries three pulleys beneath for suspension purposes. The limb is supported by slings made of woven material, rubber, metal splints, or by a combination of these. They use either Heussner's or the Sinclair-Smith glue, as means for obtaining the necessary extension, and they are careful to see that the limb is exactly counterpoised at its various parts (*Fig. 111*). For fractures of the neck of the humerus, etc., requiring a considerable amount of abduction and external rotation, the cross-bar has to be extended considerably on the side affected, so as to permit extension in an upward and outward direction (*Fig. 112*).

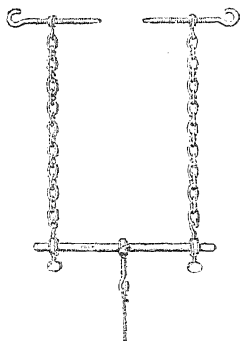


Fig. 117.—The Codivilla pin.
(From 'La Presse Médicale'.)

For the forearm these writers use a sort of cradle made of two 16-in. rods joined together near their ends by half-hoops of metal; the latter lie above the limb, and the slinging is done with bands of material passed underneath (*Fig. 113*). Fractures of the femur are treated by these authors on either a Keller-Thomas or a Hodgen. The former differs from the army pattern of Thomas splint, in that instead of a ring it has a half-ring to press against the tuber ischii, and the front of the Thomas is represented by a strap and buckle (*Figs. 114-116*).

Blake and Bulkeley use a short Hodgen bent at 135° for fractures of the leg, and employ a variety of methods to obtain traction, together with a sole-piece for suspension of the foot (*Fig. 111*).

Willems⁵ describes a modification of the Codivilla (so-called Steinmann, *Fig. 116*) pin. It consists essentially of two screws, which are inserted into the femur just above the condyles, or into the bones just above the malleoli, in the case of the leg. Chains pass from these screws to a rod, which acts as a spreader and carries the extension well below the foot (*Fig. 117*).

Hospital Beds.—Hawley,⁶ in reviewing the desirable features of a bed for military hospitals, says that it must be light, cheap, simple, easily put up or taken down; it must be possible to vary the position of the patient readily, and must be suitable for the immobilization of

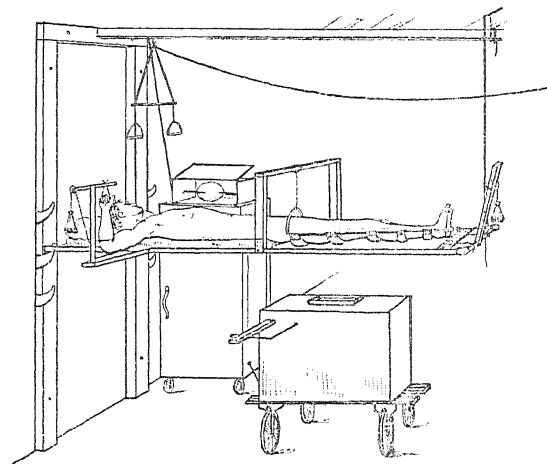


Fig. 118.—Captain Hawley's hospital bed. Showing bed with attachments for fracture treatment, and fluoroscope on wheels (designed by Captain A. H. Busby) for directing the x-rays from below.

fractures and for the taking of x-ray pictures. The floor beneath the bed should be clear, and the whole should be easily convertible into a stretcher

bed in case of emergency. Such a bed he claims to have devised: it consists of an ordinary Bradford frame, supported at one end by posts bolted to the wall, and by a rope suspended from the ceiling at the other end. The head end of the bed is adjusted by a series of hooks, while the foot may be raised and lowered by means of a rope. A lock is provided for the head of the frame, so that it is perfectly secure. Fracture attachments are fastened directly to the frame. By using an adjustable wire or canvas mattress, the Fowler position is obtained. (See Fig. 118).

Sir William Macewen⁷ describes a useful combination of a divided mattress and a pelvic elevator. The mattress consists of four portions—an upper 28 in. long, a lower 34 in., and two centre pieces 12 in. in length, with a handle at each end. When the bed-pan is to be used, the two centre pieces of the mattress are withdrawn, and to prevent the pelvis sagging the elevator is used. The elevator is made of stout metal framing, somewhat in the form of a

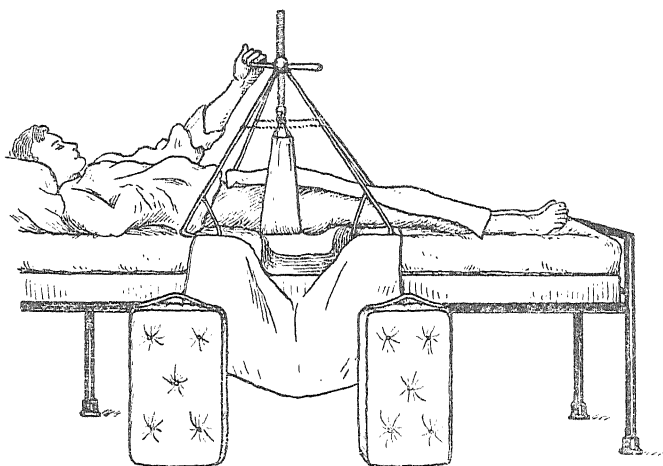


Fig. 119.—Macewen's divided mattress and pelvic elevator. Showing the weight of the patient sustained by the elevator, and the centre pieces of mattress withdrawn. (Redrawn from the *British Medical Journal*.)

fracture cradle, which is put across the patient, and, by means of a strong screw which it carries, a cross-bar supporting a sling can be raised or lowered, and thus the pelvis rests on the canvas sling (Fig. 119).

Crutches.—Clifford⁸ has adapted the principle of the swing to crutches. A swing is hung between the cross-pieces of a pair of crutches, so that a lame man sits all the time he is walking, and can rest whenever he will, thus saving much pressure on the armpits.

REFERENCES.—¹*Lancet*, 1918, i, 133; ²*Ibid.*, 1918, i, 293; ³*Brit. Med. Jour.*, 1918, ii, 480; ⁴*Presse Méd.*, 1917, Nov. 19, 653; ⁵*Ibid.*, 1917, Dec. 13, 706; ⁶*Ann. Surg.*, 1918, April, 435; ⁷*Brit. Med. Jour.*, 1918, i, 252; ⁸*Lancet*, 1918, i, 146.

ORTHOPÆDIC SURGERY. (See also *E. W. Hey Groves, M.S., F.R.C.S.*
AMPUTATIONS; JOINTS.) *C. A. Joll, M.S., F.R.C.S.*

Sir Robert Jones,^{1,2} in defining the scope and aims of 'military orthopædic treatment,' admits that the term practically covers the whole of the surgery of the extremities, and therefore a very large percentage of all war injuries.

Hospitals and Accommodation.—An orthopædic centre, this author explains, consists of: (1) A staff of surgeons with previous experience of all sides of orthopædic work—they plan the complete course of treatment; (2) Surgeons experienced in operative surgery but without special experience of orthopædic work—these are to be trained to take charge of wards in new centres as they are formed; (3) Still younger men who will ultimately go abroad; (4) A series of auxiliary departments, each under a medical man who has experience of the particular methods of the treatment he directs; these departments are electric, massage, hydrological, gymnastic, and curative workshops. Sir Robert Jones deals in some detail with the place of the curative workshop in the orthopædic scheme.¹ These have proved, he says, of considerable value. They act directly as a curative agent when the work done gives exercise to the injured limb, and the indirect value of the patient being put to useful work is not to be ignored. Workshops are also of great value in psychotherapeutic treatment; they provide occupation of a useful and interesting type—the making of the splints to be used in the hospital, special boots and gymnastic apparatus, etc.—while some patients are taught to act as clerk orderlies to help the medical officers to keep the case records. Great care is necessary to avoid fatigue when carrying out these workshop exercises, since actual harm may result if this be not watched.

Surgical Side of the Work.—The author divides the subject into preventive orthopædics and corrective orthopædics; the former requires the co-operation of all who have to treat the case from the earliest stages, while the latter is more strictly the province of the orthopædic surgeon proper. As an example of preventive orthopædics this writer refers to fractures of the femur, which he says require to be treated on more uniform lines, preferably in a series of special hospitals staffed by surgeons, orderlies, and nurses who are specially skilled in the work, and who have security of tenure of their positions, rather than the haphazard methods of the past. The two fundamental principles which govern the treatment of these cases are: (1) Efficient fixation in correct alinement at the earliest possible moment; (2) Continuity of treatment. Speaking of other fractures, this authority warns against over-extension in the case of fractures of the humerus, which he claims is the cause of many cases of non-union. Another factor is inefficient fixation. To correct the tendency to backward displacement in fractures at the lower end of this bone, he recommends a proper degree of flexion of the elbow. With the forearm, the ulna must be manipulated into correct alinement, and the limb then supinated, ignoring academic questions of the action of the pronator radii teres. In all fractures of the upper limb Jones lays down the rule that *the palm should be towards the face when the elbow is flexed*.

Joints.—The author severely criticizes the results of the primary excision of joints, on the ground that they lead to flail limbs, which are often suppurating as well. In some of these, especially the elbow, it has been possible to obtain ankylosis; but in the case of the knee, amputation is often the only resource possible. If these excisions have been practised, he advises that in the case of the shoulder the arm should be abducted to an angle of about 30°, with the elbow slightly in front of the coronal plane of the body, so as to bring the palm to the face when the elbow is flexed and supinated. The elbow should be ankylosed at nearly a right angle in working men, as a flail elbow is of very little value to such an one. For the other joints, two-thirds supination of the forearm, dorsiflexion of the wrist, slight abduction and external rotation of the hip, full extension of the knee, and at right angles with slight varus for the ankle, are recommended.

Muscles and Nerves.—Posture is of great importance in these cases in order

to prevent contractures and to encourage the voluntary contraction of injured muscles before they have regained their full powers. The author lays stress on the continuous relaxation of the paralyzed muscles in cases of nerve lesion [though, as we have mentioned under NERVE INJURIES, there is a tendency to exaggerate the danger of occasional relaxation of these postures].

Corrective Orthopædic Treatment.—Jones specially emphasizes the dangers of forcible manipulative treatment of the injuries of joints, contrasting the type of case met with in war surgery with those familiar in civil practice. In the latter, forcible manipulations seldom do serious mischief, while in war surgery severe sepsis may be lighted up and the case materially harmed. If a stiff joint is to be moved, the bones above and below must be carefully protected, especially if there has been a fracture of one of the bones.

Major Goldthwaite,³ in discussing the place of orthopædic surgery in an army organization, adds another function to those described by Sir Robert Jones—viz., pre-combat orthopædic work. This involves: (1) Instruction in the proper use of the body—standing, walking, etc.; (2) Special training by means of drills, orthopædic exercises, etc., to overcome bad habits of carriage or body use; (3) Instruction in the care of the feet; (4) Instruction in the use of standardized splints for the stretcher-bearers.

AFTER-CARE OF DISABLED SOLDIERS AND SAILORS—RE-EDUCATION PROBLEMS.

Several important papers have appeared during the year on this most important subject, and deserve some reference here. The Inter-Allied Conference held its second meeting at Westminster on May 20–25,⁴ and among the subjects discussed were kineplastic amputations (see AMPUTATIONS); the early education of the muscles of the stump, by Dr. Martin, of Belgium; the use of the continuous bath, by Major Sandes, who advocated it in spite of previous criticism from official sources; the treatment of the blind and deaf; and the treatment of the tuberculous soldier.

Professor Levi⁵ gives a description of the methods of technical re-education in vogue in Italy, which is controlled by a committee on which the disabled soldier is himself represented. The treatment is preceded by adequate moral and physical preparation of the patient, so that while he realizes that he will be hampered throughout life by his disability, he is still determined to overcome this to the highest degree possible. A popular pamphlet is disseminated among the patients, so that the rights to which they are entitled should be thoroughly understood. The preliminary treatment referred to above is given at two hospitals at Mantua and Bari, and later the patients are distributed to first-grade concentration hospitals at Turin, Milan, Genoa, Bologna, Florence, Rome, and Naples; as far as possible these are selected with reference to the native place of the patient. As soon as he is able to sit up, he is encouraged to begin such things as bead-work, toy-making, etc.; and as soon as his wounds are healed he is sent to the local concentration hospital for the completion of the physical and orthopædic treatment, and as soon as possible he is encouraged to attend the existing schools and the workshops where basket-making, coopering, and clog-making are taught; during this period the patients are provided with provisional artificial limbs. The third period of treatment now follows—the patient passes to one of the schools of re-education established in one of the towns named above. Re-educative treatment is not compulsory in Italy, but the patient has to spend fifteen days in the re-education hospital, so that he has the opportunity to see for himself the régime and to withdraw his refusal if he so wishes. It is only in the schools of re-education that the final artificial limb is provided. The resident system is preferred in Italy, but

this does not preclude the use by the patient of local training schools of a non-resident type if he wishes. A National Commission now controls the whole of this scheme, and under it a special Prosthesis Research Department has been constituted for the study of artificial limbs and their adaptation to various industrial purposes. The same general plan has been adopted for the blind and the deaf. Tuberculous patients are taught the ideals of hygiene which should regulate their lives. The disabled of every grade receive free maintenance in the schools of re-education for six months, and this period is renewable in certain cases.

McMurtrie⁶ describes the organization of re-education methods in Germany, the paper being dated the end of May, 1918. There is no central or national system of re-education in Germany, the whole process being purely voluntary. In spite of this, McMurtrie says a high degree of efficiency had been reached. Public opinion was quickly educated to the necessity of rehabilitating and re-educating the crippled and disabled soldier. Great assistance to this has been afforded by an organization which existed before the war, the German Federation for the Care of Cripples, which had developed already 54 cripples' homes, with 221 workshops teaching 51 trades. On the other hand, the German insurance system was also helpful, having already developed the treatment of the maimed and disabled as a part of its responsibility; since, if the Employers' Insurance Association was unable to restore a degree of economic efficiency, it was responsible for providing the patient with a pension. Dr. Biesalski, a leading orthopædic surgeon, toured the various cities, and urged the necessity of forming local volunteer committees for the furtherance of this treatment.

Dr. Biesalski's scheme is as follows: (1) No charity, but work, for the war cripple. (2) Cripples must be returned to their homes and to their former conditions—as far as possible to their former employment. (3) Cripples must be distributed among the mass of the people as if nothing had happened. (4) There is no such thing as being crippled while there exists the iron will to overcome the handicap. (5) There must be the fullest publicity on this subject, especially among the cripples concerned. Under this German scheme there are four stages in the treatment of war cripples: (1) Medical; (2) Provision of artificial limbs and functional re-education; (3) Vocational re-education and vocational advice; (4) Placement. The first two are the function of the Government, and the last two of the private affiliated hospitals. The latter stages are financed by a variety of sources—e.g., in Bavaria by the State, in other places partly by the State and partly privately, in yet others by purely voluntary sources, but the State supervises the whole. In spite of these apparent inconsistencies, the whole of Germany is well provided with means for the treatment of this class of case on the lines laid down by Dr. Biesalski, and there is an elaborate and complete system of co-operation between the various organizations in the various districts. The German system is to assume that all cripples can be restored to economic life, and this article of faith, for such it has become, seems borne out by the claim that 90 to 95 per cent of the cases dealt with become economically efficient.

Artificial limbs are furnished and kept in repair by the German government, which has fixed maximum prices for all kinds of prosthesis. The principle adopted in the case of the artificial limb is that the function and not the limb must be replaced. In other words, it should not be an imitation arm or leg, but a tool. The so-called Sunday arm is never supplied except on request to clerical workers. In this paper will be found a brief description of the various artificial arms in use in Germany, and many of these have been carefully standardized so as readily to be replaceable or repairable, and the cost

of them is extraordinarily little when compared with those supplied in this country.

WHIRLPOOL BATHS.

The value of these in the treatment of chronic lesions of the joints, etc., following wounds has been very variously estimated. Sonntag⁷ discusses the matter from the physiological as well as the clinical aspect. He explains their action as being partly the result of heat and partly massage. The degree to which each of these acts depends on the type of bath, the temperature, and the duration. He claims that there is an optimum temperature and time, which he says is constant for different baths. Tissues which are poorly nourished have a reaction to the baths different from normal tissues, and it is important not to overdo the treatment in such cases, lest the action of the bath should become pathological rather than physiological. The following methods of investigation were carried out: (1) The ergograph. The right arm was immersed in the bath at varying temperatures for a constant time. It was then rapidly dried and placed in the ergograph with a weight of 5 lb. attached, and tracings from the flexor sublimis taken. The interval between each contraction was one second. By a simple calculation which Sonntag gives, it is possible to work out the amount of heat generated in the muscle and to compare this with normal or untreated muscle, the whole being recorded graphically. (2) Records of temperature, pulse, and blood-pressure. (3) Measurement of joint movement. (4) Experiments on the muscles of the frog.

The optimum temperature was found by experiment to be about 108°, and at the Shepherd's Bush Hospital it is usual to graduate the baths thus: (1) To obtain increased working power of the muscles, give a bath at the optimum temperature for twenty minutes; (2) To manipulate adherent scars and stiff joints, and prepare for massage, give baths at 110° for twelve minutes; (3) For nerve injuries in the early stages, give optimum temperature baths for a short time, later on raise the time, then finally raise the temperature and cut down the time; (4) For weak scars, proceed as for nerve injuries, but raise the temperature earlier.

CHRONIC BONE SINUSES AND CHRONIC OSTEOMYELITIS.

Thévenard⁸ considers at length this important question, which involves a very common type of prolonged disability. He introduces the subject by explaining that the usual method of treating cases of this sort is to open up the bone widely by means of the chisel, and to make, as far as possible, a shallow cavity of the whole wound so as to allow of cicatrization from the bottom. This author, however, points out how desperately slow many of such wounds are in healing, and divides the methods which have been devised to remedy this state of affairs into three groups, viz.: (1) The use of stoppings of various substances; (2) Grafts; (3) Plastic operations. Thévenard does not rate very high the results obtained by either of the first two methods, and gives his preference to the third or the plastic method. The author refers to Jayle and to Péraire as having devised methods of this type independently of Thévenard himself. The essential of his own method is that he utilizes large skin flaps to lay in the cavity left after the opening up of the bone, so as to cover in the cavity completely.

He describes the technique which he uses in three steps: (1) Osteotomy; (2) The fashioning of the skin flaps; (3) The fixation of the flaps in position. The incision is first made so that the unhealthy part can be removed with the cicatricial tissue down to the bone. The bone is now removed freely so that every bit of infected and damaged bone is eliminated and the skin flaps will

rest on healthy bone tissue. The bone cavity must be so made that the surface is smooth and there are no sharp edges or irregularities on which the flap will lie. The skin flaps may be pedicled or of the sliding type, but the writer prefers the latter as likely to be more efficiently nourished. Two lateral flaps suffice for the shafts of most long bones, but at the epiphyseal ends it may be necessary to cut a series of flaps to fill in a cavity which is more or less funnel-shaped—the necessary incisions in this case will be radiating in direction. The fixation of the flaps to the bony surface is achieved by means of a series of mattress sutures passed through the base of the flap, then through the bone, finally emerging near the free edge of the flap, and the whole tied over pieces of tubing. *Figs. 120–126* illustrate the steps of the operation.

Fig. 120.—Thièvenard's plastic operation on bone. Excision of the cicatricial tissue and osteotomy.

evidence of disease. Jean prefers to use a motor burr for the fashioning of the bony cavity, to avoid the danger of trauma to bone the vitality of which

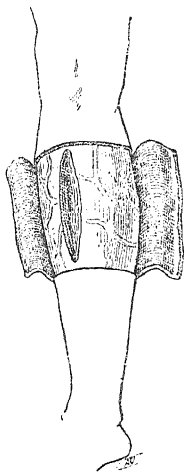


Fig. 121.—The autoplasmic flaps have been dissected. They include the skin and subcutaneous tissue, but not the aponeurosis.

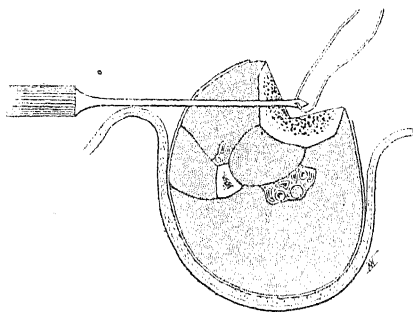


Fig. 122.—First stage of suture. The needle traverses the aponeurosis, muscles, and bone.

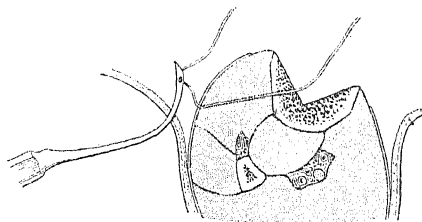


Fig. 123.—Method of suturing at the base of the flap.

is already impoverished. When this stage is completed, the gloves and instruments are changed, to avoid infecting the wound in the next stage. Flaps are now cut, and are then fixed in position by the technique of Jayle,

the skin edges being brought over the edges of the bone, but not covering the surface completely as in the method of Thévenard.

Jäkh¹⁰ employs methods which closely resemble those just described, but utilizes flaps of various types, some of them of skin, some of muscle, and others of muscle and periosteum, or of skin, periosteum, and bone. The choice of these various types will depend on the particular situation of the bony disease and on its extent.

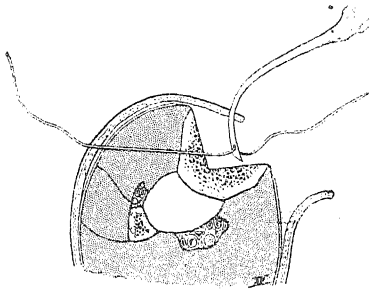


Fig. 124.—The suture passed to the free extremity of the flap, which will be fixed to the base of the cavity.

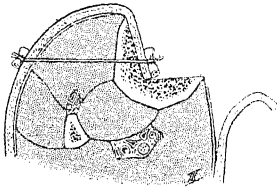
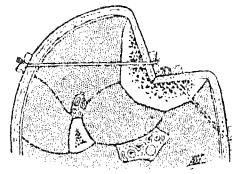
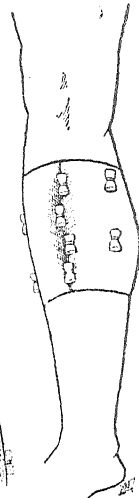


Fig. 125.—The suture in place. It traverses the integuments and the bone like a brooch, without causing any constriction.



Figs. 126, 126a.—The two flaps fixed at the base of the bony cavity, which is completely obliterated. (Figs. 120-126 redrawn from *La Presse Médicale*.)



RESECTIONS OF JOINTS FOR GUNSHOT WOUNDS.

Jean¹¹ deals with the late type of resection of the joints for war wounds. He admits that it is very difficult to give precise indications for this procedure, and that there are no hard and fast lines which can be laid down in these cases, but that every one must be judged on its merits, taking into consideration the particular limb and the joint affected. Jean employs subperiosteal methods through the classical incisions, and he uses the sharpest and most efficient tools available in order to minimize trauma. He very properly points out that to operate is not everything, and that the post-operative care is of extreme importance. He deals with the various joints seriatim.

Shoulder.—The author deals with 11 cases of his own, one of them atypical and the rest complete. The anterior incision was used as a routine, regardless of the position of the wounds. When possible the bone was cut at the level just below the bony lesion, as long as that did not necessitate resection below the surgical neck—in the latter cases the damaged shaft is not resected, but the section is made obliquely below the tuberosities, and the lateral surface is curetted where necessary, or preferably the diseased area is burred out with the engine burr. A posterior drain below the circumflex is used as a routine. For a few days the limb is fixed by means of a plaster splint to the chest wall, and later on this is changed for a triangular metal splint which is fixed to the

arm and the chest wall by plaster, and the limb is kept in this for a month. Jean also has used the Stromeier cushion, and speaks highly of it, because he claims that it is an advantage to be able to move the limb each time the wound is dressed. In 7 cases the shoulder could be abducted passively 90° and actively 45° to 50° , 2 cases were not quite healed when the report was written, 1 case shows no power of abduction because of paralysis of the deltoid, and 1 patient died of septicæmia in spite of disarticulation of the arm.

Elbow (11 cases).—In 6 cases one epiphysis had been damaged, and in the other 5 cases both. The interval between the wound and the operation was from two to four months. In the earlier ones Jean did a modified operation, and removed only the grossly damaged bone; but although these gave good results from the point of view of the preservation of the limb, the functional success was poor. In a later series he resected the bones widely on classical lines, but avoiding the resection of the lower part of the shaft of the humerus, which he regards as responsible for the disastrous results seen so often after the operation. In 7 cases the movements of the joint were preserved, in 2 cases there was fibrous ankylosis, and 2 were evacuated in a satisfactory state, but before the end-results could be ascertained. For the after-treatment of these cases Jean uses a simple metal gutter splint allowing movement at each dressing; this is left off at the end of three weeks, and then the patient is urged to use the biceps. Leriche's manœuvre is useful in this stage—the upper third of the arm is compressed by the two hands while the patient tries to contract the flexors. Extension, in Jean's experience, is always defective, and rarely exceeds 90° to 100° ; this he ascribes to periosteal outgrowths and to muscular sclerosis and atrophy.

Wrist (3 cases).—Jean reserves this operation for cases where there is damage to the forearm bones at the wrist as well as to the carpal bones. He employs the Ollier incisions, and the limb is put up afterwards in an anterior gutter splint with the hand extended. In two cases the result was not reported because the patients had to be evacuated; in the third the result was fair and a limited degree of movement was possible.

Hip.—Jean's mortality, contrary to that of most surgeons, is high—80 per cent. This he attributes to the long delay which occurred during which it was hoped to avoid the operation, and then, when it was inevitable, the operation was done under unfavourable conditions. [Our own experience is that these cases do extremely well if not unduly delayed, and the functional result is much better than would be expected from the nature of the anatomical defect which must follow such an operation.] The author appears to have tried a great variety of incisions of approach, and of these he prefers the anterior incision of Bérard, except when there is extensive damage to the shaft of the femur, when he adopts for preference the external incision. Jean holds that the anterior incision allows the preservation of the pelvi-trochanteric muscles better than any other. A posterior stab drain is used in these cases, and a plaster splint is applied from foot to pelvis, with gaps for the use of the Carrel technique if necessary.

Knee (12 cases).—These were done on an average 53 days after the receipt of the wound, and were all due to fractures which had involved the joint, and in many cases the latter had already been drained by free incisions. Of these, 45 per cent were cured, 50 per cent had to be amputated, and a half of these latter died (27 per cent). He draws the following conclusions: (1) When the general state of the patient is poor, and there is severe fever, etc., it is better to amputate; (2) In all other cases it is better to do resection, and this must be followed by amputation if the patient does not show a rapid improvement afterwards in his general condition; (3) Amputation is to be preferred when

the damage is chiefly to the upper end of the tibia, as these cases do less well than those involving the femur chiefly; (4) When there are already ankylosis and sinuses, but there is no sign of general toxæmia, Jean prefers not to subject the patient to the risks of an excision, which will assuredly light up infection. He apposes the bones and closes the wound anteriorly by one or two points of suture, and the whole of the wound is then left open and treated by the Carrel-Dakin method; only if the progress of the case is favourable is the wound closed by secondary suture and a plaster gutter-splint applied.

Ankle.—Jean practises astragalectomy in all cases of this type which are not doing well, and he avoids the least interference with the malleoli even when they are comminuted. He uses Leriche's incisions, and the limb is put up afterwards on a posterior plaster gutter-splint. In 5 out of 7 cases a firm ankylosis of the ankle was obtained; in one case of complete excision of the joint there was a poor result, and in the last there was a secondary hæmorrhage which necessitated amputation.

Foot.—For badly-infected cases he prefers to do a partial amputation of the foot, especially when the soft parts are extensively damaged, and in the older and less severe cases he merely uses the ordinary conservative and partial operations.

Chutro¹² deals with the *hip*. In a series of 9 cases with signs of severe infection between the fourth and the eighteenth day, this author is able to record 100 per cent recoveries, with a useful limb and an average shortening of just over an inch. He attributes this to a rapid method of operating and care in hæmostasis. The stages of the operation are as follows:—

1. An incision 6 in. long is made from the anterior superior spine downwards between the tensor fasciæ femoris externally, and the rectus femoris and psoas internally, avoiding the opening of the sheath of the latter so as to prevent the tracking of sepsis. A large retractor should be used at this stage.

2. The capsule is now opened by an incision running from the acetabulum to the base of the neck.

3. An osteotomy of the neck of the femur is then carried out by means of an osteotome or a chisel. The direction of the section is from without inwards, from before backwards, and from below upwards. It commences at the lower border of the neck at about its middle, and ends near the cartilaginous margin of the femoral head (*Fig. 127*).

4. With a Lane's lever the head of the femur is delivered, and any sequestra and foreign bodies are also dealt with. The wound is left widely open and

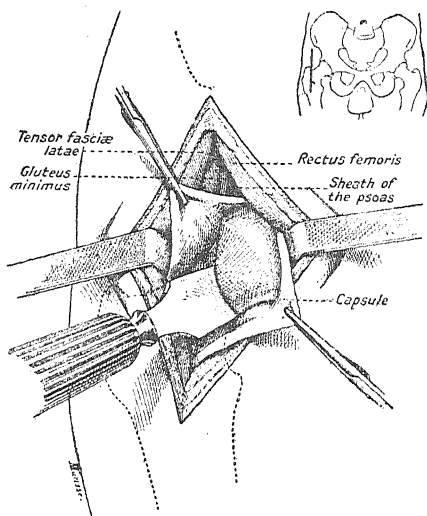


Fig. 127.—Chutro's operation in wounds of hip.
(Redrawn from 'La Presse Médicale'.)

six Carrel tubes are inserted. The subsequent healing is facilitated by strapping the edges together. Both lower limbs are extended after operation, and 12 lb. are attached to each. Counter-extension is effected by raising the foot of the bed 6 in.

Alquier and Tanton¹³ report 12 cases at intervals of eight to twelve months, and they illustrate the good results which may be obtained by a complete operation at a proper stage. For the important after-treatment they get the man up as soon as possible, and fit him with a celluloid cast, crutches being abandoned as soon as the patient can be persuaded to relinquish them. Good functional results are possible even when the amount of bone resected has been extensive; and in only one case was there firm ankylosis and in one loose fibrous pseudarthrosis.

Thevenet¹⁴ controverts the official British orthopaedic surgeons by claiming that ankylosis of the *elbow* should never be allowed to persist if the limb is otherwise sound. He claims that a flail joint cannot occur if the operation is a subperiosteal one and if a proper amount of bone only is removed. He quotes four cases to illustrate his claims.

Loveday and Stouffs¹⁵ describe a method of treating ankylosis by 'pneumatic mobilization.' The essential feature is the forcible mobilization of the affected joint by a series of rapid and restricted movements effected by means of a pneumatic apparatus which can impart up to 90 impulses per minute to the joint. The authors describe in detail apparatus and technique whereby the method can be applied to any joint in the body, and the article is fully illustrated.

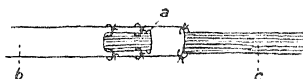
TENDONS AND FASCLE.

Leo Mayer¹⁶ considers the question of tendon operations in the treatment of gunshot wounds of the *hand*. He urges that such operations should be conducted with due regard to the physiological and anatomical features of tendons. Thus, the tension of the tendon must be consonant with that which is normal for that tendon, and it must be laid in a proper site and have a proper bed and a firm anchorage. He describes a common type of wound of the hand, perforating it from the palmar to the dorsal surface, with shattering of one or more metacarpals and of the tendons of one or more fingers. In these cases the finger affected is often useless and in the way, and on this account it is often sacrificed; but Mayer attempts to restore its function before having recourse to this mutilating method.

The operation consists essentially in the transplantation of the flexor sublimis tendon of the adjacent finger into the distal end of the damaged flexor profundus, thus leaving each finger with one flexor tendon, the profundus, in action. Two incisions are necessary in a typical case, the first running in a line with the tendon which is to be used for the graft, exposing the flexor sublimis, the second being made distal to the scar tissue of the damaged finger, the tendons of which are thoroughly freed from all adhesions. A subcutaneous channel is now bored from the proximal end of the first incision to the second one, giving it if possible a slightly curved course to avoid scar tissue. The sublimis tendon of the donating finger is then cut at the level of the metacarpo-phalangeal joint, drawn through the subcutaneous channel, and the two tendons are joined by button-holing the healthy one, drawing the other through it, and then applying fine silk sutures (*Fig. 128*). If there is not enough tendon to permit of this button-hole method, the line of suture can be reinforced by a fascial graft from the calf of the leg; the graft is made to enclose the tendons with its glossy surface outwards, and the fascia is sutured into a tubelike shape (*Fig. 129*). The extensor tendon can be similarly dealt

with, either by using the slips of the extensor communis to the index or little finger and relying on the special extensor to move them, or by taking a part only of the common extensor from one of the fingers. The sutures should be tied with the tendons in a position of complete relaxation—i.e., in the case

Fig. 128.—Leo Mayer's tendon transplant operation. Suture of tendon to tendon when overlapping is possible; *a*, button-hole opening; *b*, flexor profundus tendon of the injured finger; *c*, transplanted flexor sublimis tendon.



of the flexor tendons, with the fingers held passively flexed, the patient being of course under an anæsthetic. Movement should be begun at the end of a fortnight, and the galvanic current is helpful when it is difficult to get the patient to move the finger from nervousness, etc. A splint should be worn for at least four weeks after the operation to ensure the tendon protection

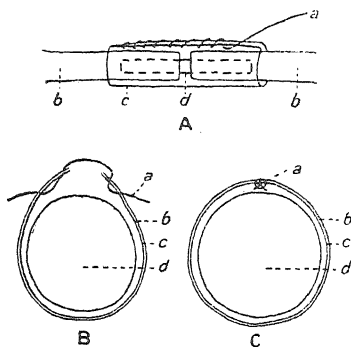


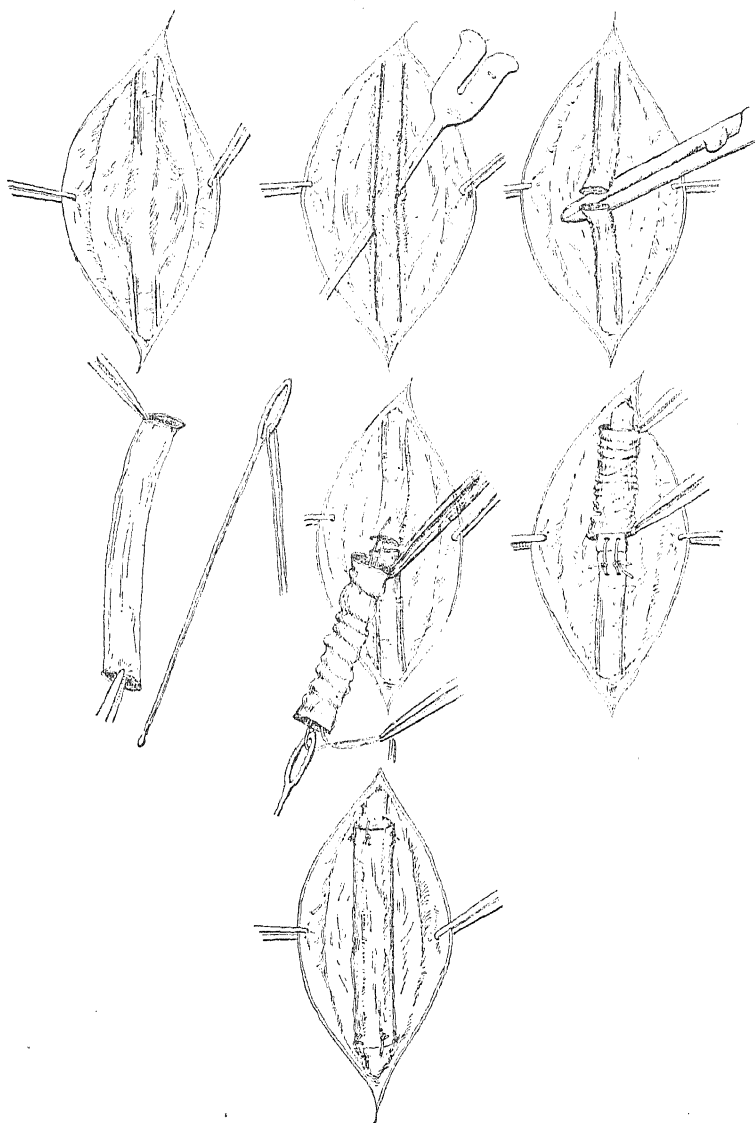
Fig. 129.—Leo Mayer's operation. (A). Longitudinal diagrammatic sketch showing the Lembert suture in process of application, which closes the tube of fascia overlapping the tendons; *a*, Lembert suture; *b*, tendon; *c*, transplanted fascia; *d*, Lange suture. (B). Diagrammatic cross-section of the tendon and transplanted fascia indicating the manner of inserting the Lembert suture; *a*, suture; *b*, fascia (superficial surface turned toward the tendon); *c*, fascia (deep surface turned outward); *d*, tendon. (C). Diagrammatic cross-section of the tendon and transplanted fascia after the Lembert stitch has been drawn taut. Note that the smooth deep surface of the fascia adapted to the gliding function is turned outward; *a*, suture; *b*, fascia (superficial surface); *c*, fascia (deep surface); *d*, tendon. (Figs. 128-129 redrawn from the "Journal of the American Medical Association".)

from overstretching. Mayer admits that the result of these operations is only partially satisfactory from the surgical point of view, but he adds that the patients were quite satisfied with the degree of improvement.

Ansiun¹⁷ suggests a method of utilizing fascia to maintain a paralyzed limb in good position and avoid overstretching of the paralyzed tendons, as a substitute for the ordinary apparatus or as an adjunct to it. The fascia lata is cut into a suitable strip, and in the upper limb is made to act as a sling from the ulna to the second metacarpal, and in the leg from the fibula to the astragalus. The strip of fascia, about $1\frac{1}{2}$ in. broad by 6 to 10 in. long, is split at each end for $1\frac{1}{2}$ in., the unsplit part is folded on itself with the fatty layer outside, and the edges are united with a continuous stitch. An incision $1\frac{1}{2}$ in. long is made over the second metacarpal or metatarsal, as the case may be, and the soft parts, including the periosteum, are detached; the bone is notched so as to make a bed for the strip, which is carried round the bone by means of a suitable carrier, and the two ends of the strip are united with silk sutures. The other end of the strip is now passed underneath the skin towards the ulna or the fibula, which has already been prepared similarly to the last incision; any desired position is then given to the hand or foot, and the two free upper ends of the fascial strip are passed round the bone as before, and the ends are sutured. The results were better in the case of the external popliteal than the musculospiral, which has to be supplemented with a splint to extend the fingers.

Gessner and Riedel¹⁸ consider the problem of the paralyzed musculospiral nerve where there is no hope of recovery of the nerve itself, and they admit

that it is difficult to provide muscles with the functions of the triceps, supinators, and extensors of the wrist, fingers, and thumb, without injuring the other functions of the hand. The supinators are easily replaced by the action



Figs. 130-136.—Grafts of internal saphenous vein to replace tendon sheaths.
(Re-drawn from '*La Presse Médicale*.')

of the biceps as a rule, and the abductor and opponens of the thumb can substitute the extensors to a certain extent. On the other hand, all splints tend to do harm, because they press on the flexors in the palm and damage them. He quotes Vulpian and others as having pulled a flexor through the interosseous membrane, and made it act as an extensor; while Sudeck shortened the extensor tendons without any transplantation. The authors operated on twelve cases by a variety of methods: (1) Tenodesis of the wrist-joint (with shortening of the finger extensors); (2) Transplantation of the wrist flexors to the finger extensors; (3) Transplantation of the wrist flexors to the wrist extensors; (4) Periosteal transplantation of the wrist flexors to the dorsal aspect of the wrist-joint. Methods 3 and 4 were associated with shortening of the finger extensors.

Grafts of the Internal Saphenous Vein to replace Tendon-sheaths.—Duvergey¹⁹ has had to deal with a large number of injuries to the flexor and extensor tendons of the fingers, and he says in this article that it is useless to attempt any operative treatment if there is the slightest degree of sepsis remaining, and that therefore the surgery of these injuries is essentially that of the healed wound. At this latter stage the scar is very often adherent to the tendon, while attempts to contract the muscle merely cause a drag on the scar, without any movement of the corresponding finger. In spite of this there is little, if any, retraction of the proximal end of the tendon; it is inserted into the mass of fibrous tissue at the level of the wound, and thus the conditions differ a good deal from those in civil life. Duvergey attributes this to the fact, which he has observed, that there are generally a few tendinous fibres left intact, and therefore the ends do not retract widely. This author makes use of the mass of fibrous tissue between the two ends of the tendon to reconstruct the new tendon, and he then isolates the tendon from the surrounding fibrous tissue. It is not necessary to dilate on the first part of this technique, but the second needs special description. Duvergey tried at first to use fatty grafts from the thigh, but he found that they adapt themselves ill to the tendon, and are rapidly absorbed and become mere fibrous tissue. He has also used Delbet's method of rubber tissue, but found that these grafts are rapidly eliminated because of sepsis; in other cases he attempted to use layers of muscle tissue, hinged on the neighbouring tissues and wrapped round the tendon, but the results were poor. Several other materials and tissues were employed with like results, until the internal saphenous was tried—this gave complete satisfaction. The technique is briefly as follows: The tendon, with its piece of cicatricial tissue bridging the gap between its two ends, is carefully freed, and the bridge preserved. The latter is then cut across so as to permit the piece of vein, which must be cut very long because of the great retraction it undergoes, to be threaded on to the tendon. The vein may have to be split to permit of it slipping up over the tendon, and it must then be drawn clear of the line of section of the tendon in order to allow of this being sutured, when it is drawn down again and the vein sutured to the tendon at the ends. The limb is immobilized for a week, and then passive movement is started, and, later, massage, active movements, and, finally, exercises are carried out. The paper concludes with an analysis of the results obtained by the author in 78 cases. The steps of the operation are shown in *Figs. 130–136*.

PLASTIC SURGERY OF THE FACE (*See also JAWS AND FACE*).

Davis²⁰ urges the co-operation of the surgeon with the dentist in this work, and that combination deserves special emphasis. [The best plastic surgery done during the war has, in our opinion, been achieved where this intimate

association of the two has existed, and many avoidable errors have been traceable to the tendency of some surgeons on the one hand to neglect the help and advice of the skilled dentist, and on the other hand to the dentist in certain cases thinking that these plastic problems can be dealt with purely from the dental standpoint.] Davis first reviews the various forms of graft on ordinary lines, and then the results of paraffin injections, in the correction of facial deformities, only to conclude that the latter should be abandoned because they are unreliable and may aggravate rather than improve deformity.

Aymard,²¹ reviewing the plastic surgery carried on in England, speaks highly of the work at the Queen's Hospital, Sidcup, and considers that the principal advances in plastic surgery in the war are of British origin. He refers to the advantages of the continuous stitch over the interrupted for this work, and to the use of an incision on the slant for the obtaining of perfect adjustment. To reproduce the red margin of the lip has always been a difficulty, and Aymard has overcome this successfully by turning down a flap from the inside of the upper lip and stitching it by its base to the new lower lip. The patient was fed by a tube, and the pedicle cut through at the end of ten days. Another advance he describes is the double-pedicled flap.

REFERENCES.—¹*Brit. Med. Jour.* 1918, i, 41; ²*Lancet*, 1918, ii, 115; ³*War Med. Surg. and Hyg.* 1918, June-July, 545; ⁴*Lancet*, 1918, i, 881; ⁵*Ibid.* ii, 53; ⁶*Med. Rec.* 1918, i, 881; ⁷*Med. Press*, 1918, i, 219, 239; ⁸*Presse Méd.* 1918, Oct. 7, 515; ⁹*Ibid.* Sept. 5, 452; ¹⁰*Med. Supp. Rev. Foreign Press*, 1918, Aug. 1, 239; ¹¹*Lyon Chir.* 1917, Nov.-Dec., 1055; ¹²*Presse Méd.* 1918, Aug. 5, 407; ¹³*Jour. Amer. Med. Assoc.* (abstr.) 1917, ii, 1914; ¹⁴*Lyon Chir.* 1917, Sept.-Oct., 871; ¹⁵*Arch. Méd. Belges*, 1918, May, 548; ¹⁶*Jour. Amer. Med. Assoc.* 1917, ii, 2107; ¹⁷*Med. Supp. Rev. Foreign Press*, 1918, Sept., 275; ¹⁸*Ibid.* 276; ¹⁹*Presse Méd.* 1918, Jan. 7, 14; ²⁰*Ann. Surg.* 1917, July, 88; ²¹*S. African Med. Rec.* 1918, Mar., 73.

OTITIS MEDIA AND MASTOIDITIS. (See also EAR AFFECTIONS AND MILITARY SERVICE.)

John S. Fraser, M.B., F.R.C.S.

The Influence of Diseases and Abnormalities of the Nose on the Ear.—Wm. Hill¹ states that otolaryngologists may be divided into two schools: (1) The 'separatist,' which asserts that nasal disease is not a factor of any importance in middle-ear disease; and (2) The 'connexional' school, which is convinced that the association is often present, and is almost a self-evident proposition. This latter school again is divided into two groups: (a) The 'negative-pressure' group believes that nasal obstruction *per se* is a cause of Eustachian congestion and obstructive tumefaction. It recognizes, however, the factor of nasal catarrhal disease as producing Eustachian stenosis and certain middle-ear changes resulting in deafness. (b) The 'catarrhalist' rejects the negative-pressure hypothesis, but accepts the catarrhal theory. Lack has drawn attention to the large number of cases of partial or complete nasal obstruction, bony occlusion of the posterior nares, deviated septum, and nasal polypi, which have normal hearing and normal ears. He notes that adenoids cause deafness, and believes that Eustachian catarrh and obstruction is the cause of the ear trouble in these cases. The deafness is often immediately relieved after removal of adenoids; the improvement might be better explained by the lessening of the Eustachian obstruction resulting from hæmorrhage than by the negative-pressure theory. The 'catarrhalist' group fully recognize that many cases of long-standing nasal catarrh do not become deaf. In many instances, however, the two conditions are associated, and lead to a conclusion that it is a case of 'cause and effect.' This group lays stress on the view that the catarrhal process, with accompanying tumefaction, spreads by continuity from the nose to the Eustachian tubes. If the deafness is relieved by inflation, or by bougieing, operative nasal treatment may be expected not merely to improve the ear condition for a time, but to arrest the further progress

of the disease. A good deal of opinion has also found expression that some unnecessary nasal operations for the relief of deafness were being done. Hill concludes that whilst we must be on our guard not to raise false hopes and promise too much from nasal operative measures, it is, on the other hand, equally important that we should not fall into the opposite error of doing too little, and therefore failing in our duty to our patient.

For clinical purposes Norman Patterson regards the middle ear as an accessory sinus or annexe of the nasal and post-nasal spaces. Infection is carried to all these cavities along their respective ducts in exactly the same way. Adenoids play the same part as an enlarged inferior turbinate, a polypus, or other swelling in the neighbourhood of the middle meatus. StClair Thomson considers that the 'negative-pressure' theory is dead. He has seen a number of patients who have been told they have a deviated septum, and that, if it is not operated upon, they will go deaf. Such statements are quite unjustifiable. But if the patient is already deaf, or has had ear attacks, he thinks it is right to tell the patient that it is a wise precaution to improve the air passages. Thomson does not agree that catarrhal processes in the nose always tend to extend to the ear. A patient may have either a congenital tendency, or a congenital loss of resistance in the nose, pharynx, or ear. Albert Gray holds that though many individuals suffer from nasal obstruction, only a limited number of these suffer from dullness of hearing. Gray believes otosclerosis to belong to the degenerative conditions, not to the inflammatory. If there is a nasal condition with a tendency to produce deafness, it is not uncommon for the deafness to progress even when the condition has been rectified. Many supposed cases of catarrhal deafness are those in which otosclerosis has also commenced. Charles Heath regards aural catarrh as a constitutional affection which may affect the ear and the nose, or either. One patient of his was a mouth-breather and had also double otorrhœa. After removal of her inferior turbinates both her suppurating ears dried up, and the perforation healed as a result of the operation. Heath joins StClair Thomson in condemning the custom of promising improvement of hearing by nasal operations. Watson-Williams states that experience has made him more of a 'catarrhalist' than before. The influence of septal deflections and adenoids mainly depends on the associated catarrhal affection. The result of operation on the septum in cases of deafness depends on the fact that the nasal obstruction has already led to a superadded infection of the nasal passages and sinuses, e.g., after an attack of influenza. He emphasizes the frequency of a latent sinus infection, sometimes non-purulent, especially of the sphenoidal sinus, as the real source of otitis media. Exploration of these sinuses by means of the suction syringe is necessary in cases requiring mastoid operation, and occupies only one minute. If there is otitis media in association with infective sinusitis, they are probably interdependent conditions. Recent observations have shown that the sinuses are infected in a larger proportion of cases than we have been led to suppose. Mark Hovell finds that in cases of persistent mouth-breathing, after removal of adenoids the posterior ends of the inferior turbinates are enlarged. He now makes it a rule to remove these structures at the time of the 'adenoid' operation. Goldsmith holds that before operating upon the nose in a case of deafness, very careful record of the degree of hearing should be made. The hearing power should also be taken afterwards, irrespective of what the patient's impressions are. Such a precaution would prevent the repetition of that kind of case in which young women have had the turbinates operated upon, and the operation for adenoids performed, with the subsequent discovery by another practitioner of commencing otosclerosis, with a family history of the same complaint.

Such procedures tend to bring discredit on the specialty. Goldsmith takes a record of the hearing, inflates, and re-examines in about twenty minutes. If the improvement is not maintained, he does not have an operation done on the nose with any idea of affecting the ear; any operation is for the nose only. Kelson claims that operation on the nose is likely to be followed by relief of deafness, tinnitus, or giddiness, when with nasal obstruction there is (1) a marked tendency to colds in the head with increase of aural symptoms during the cold, (2) improvement on inflation, (3) improvement after sniffing alkaline lotion up the nose.

Tilley is of opinion that obstruction of the nose, *per se*, has no influence in the production of those forms of deafness which are characterized as of 'middle-ear origin,' except in so far as it acts indirectly in maintaining, or promoting, catarrhal conditions.

Medication of the Tympanum per the Eustachian Tube.—Dan McKenzie² states that, if one uses an oily liquid of fair density and a Eustachian catheter of wide calibre, it is possible in most patients to blow the liquid up the tube as far as the tympanic cavity. McKenzie found the following oily solution of considerable value in the treatment of chronic catarrh of the middle ear, especially of the exudative variety:—

R	Iodin.	Resublimat.	gr. ij-iv	|	Camphor	gr. ij-v
	Ol. Sassafras	℥j (or clove oil ℥j)		|	Ol. Eucalypt.	℥ij
	Menthol		gr. iij-v	|	Paraff. Liq.	ad ʒj

The inflation and injection should be made not less often than once a week. He is guided, both as to the strength and frequency of the application, by the patient's feelings, and has never yet seen any sign of reaction in a reddening of the membrane save that which one is accustomed to see immediately after the injection is made. The pain it causes is very evanescent, lasting only about five minutes. It is possible to distinguish three distinct sensations—the Eustachian, the tympanic, and the mastoid. The first is felt when menthol is used, the peculiar cool tingling of menthol being noticeable in the cheek and lips of the same side. The tympanic sensation is felt in the area where one gets carache, and also in the external meatus and sometimes in the auricle. The mastoid sensation is seldom felt with menthol alone, but often when clove oil is used. The iodine does not seem to give rise to any sensory stimulus unless it is too strongly or frequently applied. McKenzie finds that patients certainly do appreciate some benefit from its use. Many say that they hear better, and that the 'full feeling' in the ears disappears after its use. It is wise to warm the liquid before injecting it, but care must be taken not to have it too hot.

A Method of Medicating Eustachian Bougies.—Lee M. Hurd³ recommends the following method: In a narrow test-tube make a saturated solution of gum acacia in a water-bath, then add silver nitrate solution, making the solution from 1 to 10 per cent strength of silver as desired. The bougie is dipped about 1½ in. into this solution, and when the bougie has a uniform coating it is placed to dry; Hurd usually gives the bougie a second coating. When dry, the gum acacia and silver coating looks, and to the dry fingers feels, like varnish. The silver bougies, when kept dry, will last fairly well for a week or more. A plain gum-elastic or celluloid bougie, of the proper size, is passed through the Eustachian catheter and tube to make sure of the position of the catheter and of the size of bougie the tube will admit. Then the plain bougie is withdrawn, and the coated one readily passed as far as desired and allowed to remain about two minutes, so that the moisture of the mucous membrane may dissolve the gum and deposit the silver. Hurd admits that he has on several occasions produced a serous exudate in the tympanum, with pain, tinnitus, and some

deafness for several days. The ultimate results vary: some tubes remain perfectly patent, while others relapse and require a repetition of the treatment.

Facial Paralysis in Acute Otitis Media.—Barton Jones¹ remarks that facial paralysis in connection with acute otitis media does not seem to be of very frequent occurrence. Facial paresis is brought about either by direct involvement or by pressure of exudation within the Fallopiian canal or by pressure from the tympanum. Caries of the wall may take place, even in the acute stage. In caries and necrosis of the walls of the cavum tympani the facial nerve has sometimes been found at autopsy lying free in the tympanic cavity and completely surrounded by pus, without any symptoms of facial paralysis having been observed during the life of the patient. It might be inferred from this that to produce paralysis the nerve must be subjected to pressure while confined within its narrow channel. The paralysis may come on suddenly or may be more gradual. Certain muscles may be more affected than others. Severe pain may precede its development, or the paralysis be ushered in by twitchings of the muscles.

The *prognosis* as a rule is good, though recovery may be extremely slow, and in some instances permanent impairment may be the result. The *treatment* of this condition is primarily that of the ear disease. Free drainage from the tympanum must be maintained. In the absence of definite mastoid signs, operation does not seem to be indicated. Some authors recommend **Counter-irritation** over the mastoid and the internal administration of **Iodide of Potassium**. If the paralysis should persist in spite of improvement in the middle-ear, **Electricity** and **Massage** should be employed.

The Colon Bacillus in Suppurative Otitis Media.—R. Lund⁵ states that bacteriological examination of the pus obtained at operation in 306 cases of acute or chronic mastoiditis showed the colon bacillus in 12 (dubious in 5 additional cases). In 2 of the 12 cases there was merely mastoid suppuration, but in the 10 others there were serious complications, mostly intracranial and multiple. The 7 cases with thrombophlebitis showed infarcts in the lung in 3 and gangrene in 2, while there was one instance each of metastatic pyothorax, pleural empyema, pneumonia, pericarditis, and peritonitis. There was a mastoid abscess in only 3 of the 12 cases, an epidural abscess in 9, diffuse purulent meningitis in 5; colon bacilli were found in the fluid in 1 case on lumbar puncture. Colon bacillus infection seemed to occur only as a sequence to old chronic otitis media. Mortality in the 12 cases was about 60 per cent.

Epithelioma of the Middle Ear.—F. A. Burton⁶ states that malignancy of the middle ear is extremely rare. Less than 50 cases have been reported. In most instances the diagnosis was only made after operation. Out of 16 cases collected by one observer, 11 had been preceded by otorrhœa of long standing. Very few instances of metastatic tumours have been reported when the ear was the primary focus of disease. Burton suggests that in all cases of chronic otorrhœa which occur in patients after middle life, and in which granulations shows a tendency to recur, a microscopical examination should be made. It is only by early diagnosis that it is possible to extirpate the growth.

Mastoid Disease.—P. Moure and E. Sorrel⁷ recommend the post-operative treatment of mastoiditis by the **Carrel-Dakin method**. The surrounding skin must be protected against irritation by sterile vaseline, paraffin, or other greasy substance. Irrigation should begin two hours after operation, and be repeated every two hours. The dressings should be changed at least every second day. In the writer's experience, labyrinthine irritation has never occurred as a sequela of irrigation, even with cold solution. The unpleasantness caused by occasional penetration of liquid through the Eustachian tube is only transitory. A bacteriological control is kept by the systematic enumer-

ation of organisms collected in a drop of pus in a platinum loop. An arbitrary figure of one micro-organism to every two microscopic fields is given as indicating that healing is well under way. If the microbial count rises during treatment, intracranial complication may be suspected; the authors quote a case where this application of the method led to the discovery of a cerebral abscess. As a means of checking post-operative progress, the microbial count is more informative than a leucocyte count, which should, however, in all cases supplement the former at regular intervals. The Carrel-Dakin treatment in a majority of cases aborts the period of cicatrization, and leaves a much smaller scar; the dressings are painless.

Guisez⁸ highly recommends **Vincent's Powder** (a mixture of one part of calcium hypochlorate with nine parts of powdered and well-dried boric acid) for local use after operations on the mastoid. The powder is indicated where the packing is malodorous from the start, but should not be continued too long lest granulation be promoted at the expense of epidermization. When the wound surface is dry the powder should be discontinued.

Ambrine is recommended by Major Dawse⁹ as a dressing after radical mastoid operations. He states that the melted wax is simply poured into the cavity, in the depth of which a wick of gauze has previously been laid. The gauze wick is 2 in. long, and its distal end lies free in the concha, on the surface of the ambrine wax. By gently pulling on the wick, the dressing may be removed *en bloc*. The author recommends a daily renewal of the ambrine for two weeks.

INTRACRANIAL COMPLICATIONS OF MIDDLE-EAR SUPPURATION.

Sinus Infection.—Maclay¹⁰ points out the importance of excluding malaria in cases of middle-ear suppuration and mastoiditis associated with rigors. He records a case in which four rigors took place at intervals of forty-eight hours after a simple mastoid operation. The patient, a soldier, gave no history of malarial infection, though he admitted having been bitten by mosquitoes in France. Blood-films showed malarial parasites. Administration of quinine put an end to the rigors.

Five cases of general sepsis following mastoiditis are reported by McKernon¹¹ in which **Blood Transfusion** proved a life-saving measure. In four of the five cases the mastoiditis was bilateral. The youngest patient was ten months old, the eldest six years. Two transfusions were given at intervals of several days, each consisting of between 50 or 90 c.c. of blood. The blood should be carefully tested prior to use. (See **BLOOD TRANSFUSION**.)

Meningitis.—According to MacCuen Smith,¹² otitic meningitis presents two formidable conditions which must be met and successfully combated: intracranial pressure and bacterial invasion of the blood. In some cases it would seem to be impossible to anticipate the development of otitic meningitis. In three recent cases Smith says the patients became unconscious within twenty-four hours after the initial ear lesion, and never recovered consciousness, succumbing in from twenty-four to forty-eight hours. In each instance the spinal fluid was under greatly increased pressure, and there was marked retraction of the head. It would seem that our best means of early diagnosis would be the practice of a more frequent examination of the spinal fluid in aural patients, even though we do not suspect the presence of meningitis. On more than one occasion meningitis has been demonstrated by this pre-operative precaution in spite of the fact that the patients did not present a single meningeal symptom. Given a case of suppurative aural disease, it is not only a safe but a reasonable attitude to suspect the existence of meningitis in the presence of severe headache and a rise in temperature. If, in addition, an examination

of the cerebrospinal fluid shows increased pressure, bacteria, a high cell-count, absence of sugar, presence of serum globulins, and a definite increase in the polynuclear percentage, the diagnosis of meningitis would be established and would call for immediate surgical intervention. [Such prophylactic lumbar puncture, if accompanied by examination of film preparations and cultural tests, would exclude the possibility of cases of epidemic cerebrospinal meningitis in the presence of an otitis media being regarded as cases of ordinary otitic meningitis. Such a case has been recorded by McNab.—J. S. F.]

REFERENCES.—¹*Proc. Roy. Soc. Med. (Otol. Sec.)* 1918, Feb. 15; ²*Jour. Laryng. Rhinol. and Otol.* 1918, 118; ³*Laryngoscope*, 1917, Dec., 879; ⁴*Ann. Otol. Rhinol. and Laryng.* 1917, June, 523; ⁵*Ugeskrift f. Læger*, 1917, Sept. 20; ⁶*Laryngoscope*, 1917, Oct., 755; ⁷*Rev. de Laryng. d'Otol. et de Rhinol.* 1917, Oct. 30; ⁸*Paris Méd.* 1917, Sept. 1; ⁹*Rev. de Laryngol. d'Otol. et de Rhinol.* 1917, Dec. 30; ¹⁰*Jour. Laryng.* 1918, Sept., 269; ¹¹*Trans. Amer. Otol. Soc.* 1917; ¹²*Ibid.*

OTOSCLEROSIS.

J. S. Fraser, M.B., F.R.C.S.

In a recent interesting volume on this subject, Albert A. Gray¹ states that many cases of otosclerosis are being treated by inflation, massage, etc., with the hope of improving the hearing. It takes a long time for doctors and for the patients themselves to find out that such measures are useless. He frankly confesses that formerly he frequently overlooked cases of otosclerosis combined with past or present suppurative middle-ear disease.

ETIOLOGY.—Otosclerosis manifests itself usually between twenty and forty. Gray holds that between the ages of ten and twenty, changes take place in the body which increasingly determine the occurrence of otosclerosis, and that these become still more pronounced between twenty and thirty. The disease is rare before the age of ten. Such cases are usually associated with suppurative middle-ear disease. Of 95 cases observed by Gray, 69 were females and only 26 males. Heredity is an important factor. Apart from this influence there is no single cause to which otosclerosis may be attributed. Attempts to ascribe all cases of otosclerosis to disturbances in the internal secretion, to toxic absorption, to syphilis, etc., cannot be accepted, although any one of these may be the exciting cause in a given case. There is no justification for the view that in all cases the cause is to be found in past or present otitis media. The age of onset, however, may be very greatly affected by local inflammatory activity in the middle ear. The children of parents who are victims of otosclerosis should be guarded with especial care against every factor which may tend to middle-ear disease.

PATHOLOGY.—Gray asks, How did the condition originate? The disease must have arisen some time in the history of the race, and, that being so, is there any reason why it should not occasionally originate in the present time? It certainly exists in animals. Gray thinks that the answer to his question is to be found in the evolution of the organ of hearing. He holds that otosclerosis is a variation, using this term in its biological sense. The primary fault is an inherent defect in the living cells of the organ of hearing. All other general constitutional conditions are merely contributory, while local pathological changes in the middle ear are not essential to the incidence of the disease. Variations are more apt to occur in structures that are of comparatively recent origin than in those of more ancient descent. For this reason otosclerosis selects the foot-plate of the stapes, the bony walls of the cochlea, and, in some cases, the nerve structures of this organ, while it almost invariably leaves the other (balancing) portions of the labyrinth untouched.

There are three types of changes in the bone in otosclerosis: (1) By far the most common is that in which absorption is followed by deposition, the new-formed bone being in excess of that absorbed; (2) A type in which the absorp-

tion is followed by deposition, but the new-formed bone falls short in amount ; (3) In the third type absorption occurs without any subsequent deposition. Out of four cases examined microscopically, two were of comparatively short duration, and there was no ankylosis of the stapedio-vestibular joint ; in the third case the disease had lasted twenty-five years, and there was a bony ankylosis, though only an extremely fine ridge ; in the fourth case, in which the affection had been present for over sixty years, the foot-plate of the stapes was united by bone all round its circumference. Gray regards otosclerosis as a degenerative process, and suggests still another name for the disease : 'idiopathic degenerative deafness.'

PROGNOSIS AND TREATMENT.—As regards otosclerosis, the human race may be looked upon as 'a series in a scale.' At one end are found individuals in whom the potentiality for developing otosclerosis may be considered negligible ; at the other end are those in whom the potentiality is exceedingly strong, and in whom 'practically no special stimulus' is necessary to call otosclerosis into existence. There can be no routine treatment for otosclerosis ; every case must be a study in itself. Gray admits that the results of treatment, so far as improvement goes, are generally unsatisfactory. In a large number, especially in the very early stages, the disease may be arrested or greatly retarded. In a few some improvement may be obtained. If the affection comes on early, the outlook is extremely bad. Hereditary otosclerosis is unfavourable. If tinnitus is marked, the case is likely to progress rapidly. In the pure form of the disease unassociated with catarrh of the pharynx or middle ear, a moist climate has no particularly bad effect, but severe cold is unfavourable. Gray lays great stress upon **Diet**, and states that meat, which permits of considerable toxin-formation, has a bad effect. Alcohol, tobacco, strong coffee, and tea are also unfavourable. The injurious effects of pregnancy and the puerperium have been rather over-estimated. Dieting, laxatives, intestinal antiseptics, the elimination of septic food, vaccine treatment, all have a place. We can thus do something better than merely tell the patient to learn lip reading or to use an artificial aid to hearing ; the value of the former has been considerably exaggerated. Gray has treated twelve cases according to Heath's method—applying blistering agents to the tympanic membrane. In not a single instance was there any improvement in the hearing at any time. Several of his patients have also been treated by the Zund-Burguet method, but not by Gray himself. None of these patients were benefited either as regards hearing or tinnitus. "People suffering from deafness can be easily persuaded that they hear better as the result of treatment of any kind directed to the ear."

For further details readers should consult Dr. Gray's monograph itself.

REFERENCE.—¹*Otosclerosis* (London, H. K. Lewis & Co., 1917).

OVARY, DISEASES OF.

W. E. Fothergill, M.D.

Conservation of the Ovary.—J. O. Polak's¹ previous series of 132 cases showed that a conserved ovary, if unhealthy, left the patient worse mentally, nervously, and physically, than if total extirpation had been done. When the patient is of menopause age, total ablation gives the best results. When ablation is done in young women, the surgical menopause is more severe after operations for new growths than after operations for pelvic infection. The objects of leaving an ovary are : (1) To preserve the possibility of future pregnancy ; (2) For the continuance of menstruation ; and (3) For the continuance of the trophic influence of the ovary. Since writing the former paper the author has studied the conditions found in 73 re-operations for clinical suffering and subsequent disease in the retained ovary. He concludes that, in spite of good technique, the circulation of the retained ovary is embarrassed, and primary enlargement

of the organ is the rule. Cyst formation is observed, and if the enlargement disappears later, pain and tenderness persist. The well-being of patients may be seriously impaired by routine conservation. The records of over 300 patients followed for five years show that the average life of the ovarian function, after the uterus has been removed, is not over two years. During that time flushes, dizziness, and pre-menstrual pain occur in the large majority. Ovulation without menstruation has little psychical value. Polak's study of the 73 re-operations within five years leads him to state that routine conservation is not good teaching, as the regeneration of the conserved ovary depends largely on the type and duration of previous infection and on the state of the individual ovary. Even when the most careful technique is observed, the ovarian circulation is impaired. The retained ovary without the uterus is always a focus for possible trouble. Its life is of short duration, and the value of its trophic influence has been over-estimated. The patient whose ovaries are removed has fewer nervous symptoms than the woman with a diseased ovary conserved.

Hæmatoma of the Ovary.—Emil Novak² has studied 85 cases of hæmorrhage into the ovary. The great majority of the patients from whom these ovaries were removed suffered from the results of pelvic infection, but hæmatomata were found in association with all the common forms of pelvic disease. In the majority of cases hæmorrhage occurred in connection with the follicular structures, bleeding direct into the ovarian stroma being rare. In the follicular group of hæmatomata the commonest are those caused by bleeding into Graafian follicles of abnormal or arrested development. The source of the hæmorrhage is the vascular theca interna; thus the hæmatoma is in the first place perifollicular, rupture into the follicle occurring subsequently. Bleeding into the normal follicle during its maturation occurs sometimes, and the corpus luteum is a common site for hæmatoma. The normal development of the corpus luteum may be arrested at any stage by excessive bleeding into its cavity, and this occurs especially during the vascularization of the lutein layer. True 'ovarian apoplexy' or hæmorrhage into the stroma is not frequent, and it occurs most often in the course of infectious diseases or with severe local inflammatory lesions. It has been observed in the fœtus, and also in the young child. The writer considers that ovulation tends to occur between the seventh and the sixteenth days of the menstrual cycle, and study of the menstrual histories of his cases shows that the ovarian bleeding tended to coincide with ovulation as regards the developing follicle, but is much later in the cycle when the corpus luteum is concerned. The presence of hæmatoma of the ovary appears to have no effect upon the menstrual function.

REFERENCES.—¹Amer. Jour. Obst. 1918, Aug., 199; ²Johns Hop. Hosp. Bull. 1917, Nov., 349.

OZÆNA. (See NOSE.)

PARALYSIS.

J. Ramsay Hunt, M.D.

Exhaustion Pseudoparesis.—Under this heading Ramsay Hunt¹ has described a fatigue syndrome simulating early paresis, developing under intensive military training. In three of the cases the clinical diagnosis of paresis seemed fairly certain, and the fourth, although doubtful, was very suspicious; yet serological examinations of the blood and spinal fluid from all of the cases were quite normal, and practically all symptoms disappeared after a week or ten days' rest. In his opinion this condition was dependent on an exhaustion of the cerebrospinal centres. All of the cases were characterized by certain somatic symptoms strongly suggestive of early paresis, namely, the pupillary

changes, the tremors, and the disturbances of articulation. This triad of symptoms was so manifest, and resembled so closely those observed in the early stages of paresis, that the clinical diagnosis appeared reasonably certain, an interpretation which seemed all the more probable as cases with apparently similar symptoms were also encountered in which the diagnosis had been confirmed by serological tests of the blood and cerebrospinal fluid. It was a surprise, therefore, when the serological reports were returned negative, and the various symptoms gradually subsided under appropriate rest and treatment. The mental and general cerebral symptoms were not marked in any of the cases, and, considered alone, would not have suggested paresis. Viewed, however, in relation to the somatic symptoms, they appeared significant, which was true also of subjective symptoms, such as headache, vertigo, insomnia, depression, and nervous irritability. Alone they would have indicated only extreme fatigue or a functional disturbance; associated, however, with defective and sluggish pupillary responses to light, a parietic speech disturbance, and marked facial tremors, they might well suggest the early neurasthenic symptoms of the parietic. The gradual abatement and final disappearance of all suspicious symptoms at the end of a week's rest would indicate an exhaustion of the cerebral centres as the probable cause. Under still greater provocation of stress and strain, it is not improbable that such fatigue symptoms might even be the forerunner of a more serious type of exhaustion neurosis or neuropsychosis. It is now held by most observers that fatigue is associated with the production of certain toxins which act on the central nervous system as well as on muscle tissue. Therefore, in addition to nerve exhaustion, the theory of a low-grade intoxication of the nerve centres from fatigue products must be considered as a possible explanation of the symptoms. It is well known also that fatigue is a frequent cause of tremor, and a tremor after prolonged muscular activity is known to all from personal experience. The unusual degree, wide distribution, and persistence of the tremor in these fatigue cases were probably dependent on the prolonged mental and physical strain and a special predisposition to exhaustibility of the nerve centres. As the mechanism of speech requires a very delicate co-ordination of higher cortical centres than muscular activity, it is perhaps not surprising that the disturbance of articulation noted in the group of cases should have occurred. More difficult of explanation are the pupillary phenomena. It is well known that during the convulsive crises of epilepsy, and even hysteria, the pupils dilate and are rigid to light; and Redlich has shown that the same phenomena may occur during violent muscular effort. It is not, however, so generally known that in simple exhaustion states the pupils are dilated and may be sluggish to light, with preservation of the reaction on accommodation, a clinical fact that has been emphasized by Bumke. Perhaps here we have an explanation for the suspicious pupillary phenomena that were noted in these exhaustion cases. The author has not observed a similar condition in civil practice, which may be in part due to the unusual etiological conditions furnished by life in a training camp. Under the same conditions, however, as obtained in these examinations, he believes that the formal recognition of a fatigue syndrome simulating early paresis is worthy of consideration.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1918, 11.

PARALYSIS, FACIAL. (*See* OTITIS MEDIA.)

PARALYSIS, GENERAL. (*See* MENTAL DISEASES; SYPHILIS OF NERVOUS SYSTEM; and ELECTROTHERAPEUTICS, p. 22.)

PARALYSIS, INFANTILE. (*See* POLIOMYELITIS.)

PARALYSIS, SURGERY OF. (*See NERVES, PERIPHERAL.*)**PARAPLEGIA.****J. Ramsay Hunt, M.D.*

The differential diagnosis between functional and organic paraplegia or paraparesis is now of much interest, on account of the large number of both affections in military hospitals. In many cases it is easy, in others extremely difficult and only possible after repeated careful examinations. Further, we have to bear in mind that functional symptoms may be associated with those of organic disease. R. T. Williamson¹ reviews our knowledge of this subject, and directs attention especially to certain early signs of organic disease. The following are well-known points in the differential diagnosis:—

Paralysis of the bladder, with incontinence of urine (overflow incontinence, or constant dribbling of urine), points to organic disease; it does not occur in functional paraplegia, though in this condition retention of urine occasionally occurs. Reaction of degeneration on electrical examination of paralyzed muscles is found in some cases of organic paraplegia; it does not occur in functional paraplegia. Marked localized atrophy is not conclusive, but it would be in favour of organic paraplegia. Detection of bullets and foreign bodies, fractures of vertebrae, or of their laminae or processes, by x-ray examination, signs of aneurysm, caries, or growth, etc., are valuable indications in favour of organic disease of the spinal cord in certain cases.

History of a girdle pain, of root symptoms, or of severe pain in the back, for some time previous to the onset of paralysis, are points in favour of organic disease, and especially if anaesthesia can be detected in the distribution of the spinal nerve roots at the level of the girdle pain.

Crossed paralysis—marked paralysis of the leg on one side and of the arm on the opposite side, with the other leg and arm less affected, or paralysis of the leg on one side and anaesthesia of the opposite leg—would be in favour of organic disease.

Certain reflexes are of the greatest service in the differential diagnosis and early recognition of organic disease, and especially valuable in early cases are the Babinski or Oppenheim reflex, and in many cases the loss of the tendo Achillis reflex, since these signs may be detected when other definite changes have not yet occurred.

The chief difficulty occurs when the knee-jerks are not lost, and when ankle clonus, rectus-clonus, and clasp-knife rigidity are not obtained. In one group of cases the Babinski or Oppenheim reflex is obtained, and this is diagnostic of organic disease. In other cases the plantar reflex is not of the Babinski type, and it may be lost or feeble. In these the loss of the tendo Achillis reflex would be diagnostic of organic disease.

The following are combinations of diagnostic importance, especially at the onset of a number of organic affections: Paresis, with loss of the tendo Achillis reflex, as in early anterior poliomyelitis—chronic, subacute, or acute. Paresis with loss of the plantar reflex and loss of the tendo Achillis reflex (in many organic diseases). Paresis with double sciatica and loss of the tendo Achillis reflexes, as in early cauda equina lesions. Paresis with loss of the tendo Achillis reflex, loss of the vibrating sensation, and pains in the legs, as in early peripheral neuritis. Loss of the vibrating sensation with very slight inco-ordination and very slight paresis, with or without a Babinski reflex, as in early combined postero-lateral degeneration of the cord. Paresis with Babinski reflex (in many organic affections). Paresis with loss of the vibrating sensation and Babinski reflex (in the early stages of several organic diseases of the cord). Root pains, or root symptoms, followed after a period of weeks or months by paresis, as in meningeal spinal tumour. (In all these early combinations the knee-jerks may be obtained.)

The *vibrating sensation* is often of much service in the diagnosis of organic from functional affections. In cases with marked affection of sensation, organic and functional, the vibrating sensation is, of course, often lost, along with sensation for touch, pain, and temperature. Also, in cases of organic disease limited to the motor parts of the spinal cord and in many functional affections, the vibrating sensation and all other forms of sensation are normal at all stages. But with respect to diagnosis, the important point is that loss of the vibrating sensation is frequently one of the earliest signs of sensory affection in certain organic diseases of the spinal cord. At a later date other forms of sensation may be affected; but for a period—in some cases short, in others long—loss of the vibrating sensation may be the only objective sign of sensory affection in many organic diseases.

REFERENCE.—¹*Brit. Med. Jour.* 1918, 275.

PARATYPHOID FEVER. (*See also* TYPHOID FEVER.) J. D. Rolleston, M.D.

Paratyphoid Fever A.—Galambos¹ gives the following clinical description of paratyphoid fever A. With few exceptions the disease begins with a rigor, which recurs as a rule daily, and at the same time, for one or more weeks. As in paratyphoid fever B, a rash occurs in two-thirds of the cases (even in the mildest), appears late in the disease, and is macular, thus differing from the maculo-papular rash of typhoid and the papular rash of paratyphoid B. It is seen on the trunk and spreads to the extremities, in rare instances to the neck, and even the face. Relapses occurred in 10 per cent. of Galambos' cases. The disease was mild in 40 per cent, moderately severe in 40 per cent, severe in 20 per cent. The average mortality is 2.8 per cent, and was reduced by **Methylene Blue** treatment to 1 per cent.

In an article on the prevalence of paratyphoid A fever in Bulgaria, Tschipeff and Fürst² state that the clinical course was extremely mild and the mortality very low. The principal symptoms were headache, fever, and a slightly coated, dry tongue. There were no intestinal manifestations nor bronchitis, and only faint rose spots. Two varieties of the disease were seen. The first, which constituted 75 per cent of the cases, resembled influenza, and was characterized by its short course (four to five days) and the slight degree of constitutional disturbance. In the second or typhoid form the fever lasted ten to fourteen days, and somewhat resembled a very mild form of typhoid. Paratyphoid A bacilli were found in the stools in only 20 per cent, but in 80 per cent they were cultivated from the blood.

Schurer³ emphasizes the mild character of paratyphoid A fever. As a rule it resembles mild typhoid, and a continued fever of long duration is exceptional. Of his 177 cases only one died. The real mortality is probably less than one-third per cent, as a positive bacteriological result is not obtained in half the cases. Gastro-enteritis, which is common in paratyphoid fever B, occurs very rarely, if at all, in paratyphoid A. Apart from the milder course, paratyphoid A is distinguished from typhoid by the greater frequency of an acute onset, the more remittent character of the temperature curve, and the greater frequency of involvement of the large intestine giving rise to dysenteric symptoms. Walterhöfer⁴ describes an outbreak of 53 cases of paratyphoid A fever in the neighbourhood of Lake Doiran in Macedonia. The clinical picture was that of typhoid, and the diagnosis was only possible by bacteriological examination. The mortality was nil, but various complications were observed, e.g., deafness of central origin, neuritis, neuralgia, thrombosis of the saphena, enlargement of the liver, jaundice, myositis, arrhythmia, tachycardia, purulent otitis, and hæmorrhagic tendency. Twenty-one cases relapsed, the duration of the relapse varying from two to twenty-eight days.

Chronic carriers were observed, the longest period during which bacilli were excreted being 138 days.

Lyon⁵ describes the first case on record of *paratyphoid A spine*, which occurred on the fifty-eighth day of disease. The fourth and fifth lumbar vertebrae, and later the ninth and twelfth dorsal and first three lumbar vertebrae, were affected. Fever, swelling of the soft parts, and changes in the shape of the vertebral column were absent, but there were signs of root irritation and neuritis.

Pagniez and Vallery-Radot⁶ record a case of paratyphoid A fever showing that the same *nervous complications* may occur in paratyphoid A as in ordinary typhoid. A soldier, age 34, developed right facial paralysis with brachial monoplegia and aphasia in the first week of paratyphoid A fever. There was no history of syphilis, and the Wassermann reaction was negative in the blood and cerebrospinal fluid, which was sterile, and contained an excess of polymorphonuclears. The writers attribute the condition to cerebral softening due to endarteritis. Symptoms of epilepsy developed several weeks afterwards, being most probably caused by cicatrization of the softened area. A case of polyneuritis following paratyphoid A, causing paresis of the lower limbs without any sensory changes and ending in complete recovery, is reported by Cestan, Descomps, Euzière, and Sauvage.⁷

MORBID ANATOMY.—Schöppler,⁸ writing on the morbid anatomy of paratyphoid A fever, concludes: From a pathological standpoint paratyphoid A is more closely allied to typhoid than to paratyphoid B, as is shown by the well-marked involvement of the solitary follicles, Peyer's patches, lymphatic glands, splenic enlargement, and intestinal ulceration. Moreover, the clinical picture of paratyphoid A resembles that of typhoid, and paratyphoid A bacilli are more closely related to typhoid than to paratyphoid B bacilli. Sternberg⁹ performed autopsies on 14 cases of paratyphoid A, 6 of which showed typical typhoid ulceration confined exclusively to the large intestine, and in half of these there was also follicular enteritis. In the other 8 cases there was only follicular enteritis, almost entirely confined to the large intestine. The other lesions closely resembled those found in paratyphoid B.

Paratyphoid Fever B.—Sluka and Strisower¹⁰ state that paratyphoid fever B is commoner in war than in peace time, because the conditions favourable to its occurrence, viz., special virulence of the organism, massive infection, and diminished resistance of the host, are most likely to be realized in war. The occurrence of intestinal catarrh and of dysentery favours paratyphoid B infection, which may be spread from man to man or be conveyed by food, especially by the meat from cattle slaughtered on account of foot-and-mouth disease.

Hamburger and Rosenthal¹¹ describe three forms of paratyphoid B fever: (1) Typhoid form; (2) Gastro-intestinal form; (3) Pseudo-influenzal form. In the typhoid form, to which 11 of their cases belonged, the incubation period ranged from six hours to six days, and thus might be as short as in the gastro-intestinal form. The febrile period varied from nine to twenty-three days, and in 3 cases only did it extend to twenty-eight, thirty, and thirty-six days. In most of the cases the sensorium remained clear. Six cases showed delirium, disorientation, and the typhoid state, and some others obstinate insomnia, headache, neuralgia, slight nuchal rigidity, and cramps in the calves. Rose spots appeared profusely from the sixth to the tenth day, but were usually papular, and larger than those present in typhoid fever. In the great majority of cases there was no enlargement of the spleen. The stools were normal or intermittently constipated in all, except 9 with diarrhoea. In no case was there intestinal hæmorrhage. The diazo reaction was

positive in 30 per cent of the cases. The following complications were noted: appendicitis, cholecystitis, thrombophlebitis of the saphena vein, in 2 cases each; and pleurisy, parotitis, and orchitis, in 1 case each. Fourteen cases belonged to the gastro-intestinal form, 9 being severe and 5 mild. The spleen was found to be enlarged on percussion in 3 cases only; herpes and rose spots were absent, and the diazo reaction and blood cultures were negative. The pseudo-influenzal form which was seen in 7 cases was characterized by prostration, headache, pains in the limbs, respiratory catarrh, slight sore throat, and pharyngitis. Intestinal symptoms, rose spots, and bacteriæmia were absent. As the search for paratyphoid B bacilli in the faeces was often negative, the diagnosis depended upon agglutination reactions.

Romanelli¹² records a case of *cancerum oris* in a boy, age 12, which developed at the end of the first week of paratyphoid B fever. Bacteriological examination showed a large number of spirilla, fusiform bacilli, and cocci. Death took place in spite of intravenous injections and local applications of arsenobenzol.

Bergolli¹³ describes a case of *orchitis*, *epididymitis*, *vesiculitis*, and *suppurative nephritis* due to *B. paratyphosus* B. Death was preceded by meningeal symptoms, and post mortem, the kidney was found studded with miliary abscesses containing *B. paratyphosus* B, the left seminal vesicle was full of pus, and the meninges and brain substance were extremely œdematous.

A case of *left hemiplegia* following paratyphoid B fever and attributed to cerebral arteritis is reported by Cestan, Descomps, Euzière, and Sauvage.⁷

MORBID ANATOMY.—Sternberg⁹ discusses the morbid anatomy of paratyphoid B in a paper based on the study of 75 cases, which he classifies in the following three groups: (1) Cases with follicular ulceration and no deeper lesions; (2) Cases showing not only follicular ulceration but also typical typhoid ulcers, which in some cases were also present in the large intestine; (3) Cases in which typhoid ulcers only were present, and were usually situated in the small intestine, but often in the large intestine as well. All the cases presented marked swelling of the lymphatic glands and enlargement of the spleen. Zenker's degeneration of the muscles and hæmatomata of the recti were frequently observed. Various forms of suppuration were noted, e.g., parotitis, cervical adenitis, otitis, renal and cerebral abscesses, etc., from which the paratyphoid B bacillus was isolated. Parenchymatous degeneration of the myocardium, liver, and kidneys was also recorded, but acute nephritis was seen in one case only. Lobar pneumonia was a frequent occurrence.

REFERENCES.—¹*Med. Supplement Rev. Foreign Press*, 1918, 63; ²*Ibid.* 338; ³*Ibid.* 338; ⁴*Ibid.* 248; ⁵*Ibid.* 27; ⁶*Ibid.* 338; ⁷*Bull. Soc. Méd. Hôp. de Paris*, 1918, xlii, 568; ⁸*Med. Supplement Rev. Foreign Press*, 1918, 279; ⁹*Ibid.* 107; ¹⁰*Ibid.* 9; ¹¹*Ibid.* 209; ¹²*Riforma Med.* 1918, 248; ¹³*Med. Supplement Rev. Foreign Press*, 1918, 131.

PAROTID GLAND, SURGERY OF.

W. I. de C. Wheeler, F.R.C.S.I.

Unilateral Hyperscretion of Saliva.—M. C. Escalada and J. M. Jorge, Jr.,¹ describe a case of this condition. The parotid gland was much enlarged, and the saliva spurted from Stenson's duct in a fine jet when the gland was compressed. The flow was so profuse that the man was unable to work, while he suffered constantly from thirst and headache. The flow of saliva during the night filled a basin. Under bromides the flow was transiently less profuse. On the assumption of reflex hypersecretion from irritation of the auriculo-temporal nerve, this nerve was twisted until its finest fibres were torn. The technique was that applied by Leriche, Dieulaufé, and Aigrot to reduce hypersecretion from various causes. The nerve was reached at the back of the condyle of the lower jaw. The operation was comparatively insignificant,

but proved a complete success, as also in two other cases with annoying hypersecretion with cancer in the tongue or cheek.

A Method of Incising Parotid Abscess without Injury to the Facial Nerve Distribution.—Instead of the long, painful wait for something to happen when suppuration has been recognized in the parotid gland, H. Lilienthal² offers prompt relief by an incision, which he claims permits of free drainage and the avoidance of unsightly scars as well as injury to the important branches of the facial nerve. The description of his method is as follows, although modifications, he believes, will occur to the surgeon according to the requirements of the case: A vertical, skin-deep incision is made in front of the auricle and as close to it as possible; this incision is extended to the hollow behind the angle of the jaw, and thence in a gentle curve forward as far as the projection of the anterior border of the masseter muscle; the flap of skin thus formed is reflected forward, revealing the greater part of the parotid gland with its overlying fat and fascia. The incisions—as many as are necessary for drainage—may now be made through the parotid fascia into the gland itself, the line radiating in a general way along the course of the pes anserinus. No incision, however, should cross the line of Stenson's duct for fear of salivary fistula. Deeper collections of pus may be evacuated through this same cutaneous incision by puncturing through the fascia behind the ramus of the jaw and then enlarging the opening with the director and dressing forceps. The opening into the parotid may be packed or otherwise drained, the skin-flap not being replaced until healing is well advanced, when it may be held in position with adhesive strips.

REFERENCES.—¹*Rev. de la Asoc. Med. Argentín.* 1918, Jan.-Feb., No. 158-159 (abst. *Jour. Amer. Med. Assoc.* 1918, i, 1641); ²*Amer. Jour. Surg.* 1917, xxxi, 101 (abst. *Surg. Gyn. and Obst.* 1917, Nov., 420).

PEDICULOSIS.

E. Graham Little, M.D., F.R.C.P.

Pediculosis Pubis.—Bapty¹ advises, instead of the usual treatment of shaving the hair and applying mercurial ointments, the use of **Petrol** or **Gasoline**, with which the hairy parts may be simply bathed. Where this is unobtainable, kerosene may be used, but this should be allowed to remain only a short time on the parts, and then bathed off with soap and water. (*See also ECZEMA.*)

Destruction of Nits in Clothing.—Bucot² conducted some interesting experiments on the resistance of nits to various methods of destruction. Hot water and dry heat at 55° C. destroyed both nits and active lice within thirty minutes; at 60° C. fifteen minutes was enough. Steeping of clothes for twenty minutes in 2 per cent solution of **Lysol** or **Cresol Soap**, at temperatures not below 50° F., is quite effective.

REFERENCES.—¹*Brit. Med. Jour.* 1917, ii, 676; ²*Ibid.* 1918, i, 479.

PERICARDITIS.

Carey Coombs, M.D., F.R.C.P.

Christian¹ calls attention to the clinical fact that in many cases of acute pericarditis there are signs of compression (pseudo-consolidation) of the lower lobe of the left lung. These signs—dullness, bronchial breathing, and bronchophony—are found not only in pericarditis with fluid in the sac, but also in cases where there is no effusion into the pericardium. He discusses the causation of these signs. In the writer's opinion they are due to two factors: (1) Compression by (a) enlarged heart, (b) fluid in the pleural sac; (2) Reflex immobilization of the diaphragm (such as is known on x-ray evidence to occur in pericarditis) leading to collapse of the lower lobe of the left lung. The signs are of some prognostic importance, as they are an indication of a severe attack of carditis.

Trémalières and Caussade² separate a special group of cases from the ill-defined syndrome, adherent pericardium. In these cases, x-ray examination shows that the pericardium is adherent to the diaphragm (*Figs. 137 and 138*); there is anginal pain; and the apex-beat is not definable. In the presence of cardiac pain not easily accounted for, the possibility of this lesion should be borne in mind, they think.

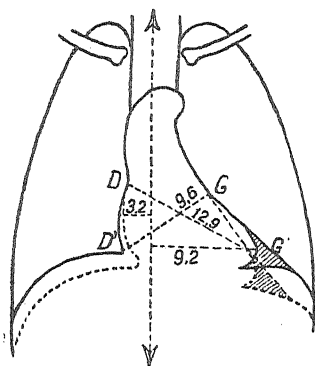


Fig. 137.—Left phreno-pericardial adhesion. The thick line shows the position in moderate inspiration, and the dotted line in deep inspiration.

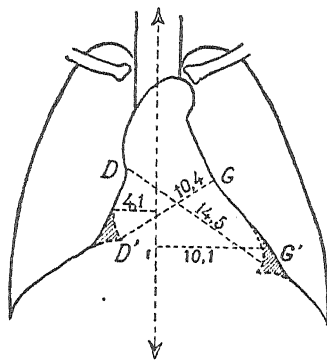


Fig. 138.—Left and right phreno-pericardial adhesions during deep inspiration.

Davis³ records a case of suppurative pericarditis, of metastatic type and following acute osteomyelitis, successfully treated by operation—resection of the fourth and fifth left costal cartilages followed by prolonged drainage. A year after operation some clinical evidences of pericardial adhesion remained.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1918, ii, 419; ²*Presse Méd.* 1918, 169; ³*Surg. Clin.* 1917, i, 375.

PERIPHERAL NERVES, SURGERY OF. (See NERVES.)

PERITONITIS, TUBERCULOUS.

X-ray therapy in (*see p. 41*).

PERLÈCHE.

E. Graham Little, M.D., F.R.C.P.

Lane¹ contributes a very elaborate thesis on this somewhat neglected subject, with an especially full historical and bibliographical consideration. The disease is relatively common in young children, affects chiefly the commissures of the lip, is usually bilateral, and is characterized by the presence of sodden whitened epithelium which often exfoliates, and fissures ensue, which are very intractable. Hemorrhage is frequent, but moderate in degree. There is rarely any hypertrophy of the lip, and hardly any inflammatory reaction. The condition is to be differentiated from herpes simplex, which always shows vesicles, which are not present in perlèche; from eczema, which is more frequently unilateral, does not show the whitened patches of perlèche, and causes deeper fissures and more hemorrhage; from the mucous patch of syphilis, which is sometimes exceedingly difficult to distinguish from perlèche, but other symptoms of syphilis would usually be present, and the syphilitic patch always exhibits erosion. The treatment recommended is to paint the lesion every day or every other day with an antiseptic lotion, such as 10 per cent solution of Silver Nitrate. [This seems rather too strong an application

for young children.—E. G. L.], 5 per cent **Chromic Acid**, or a 'diluted' tincture of **Iodine**. The condition is very infective, but the bacteriology is greatly disputed. The majority of authorities ascribe it to a streptococcal infection, and group it with impetigo.

REFERENCE.—¹*Jour. Cutan. Dis.* 1917, Aug. 19, 433.

PERNICIOUS ANÆMIA. (See ANÆMIA, PERNICIOUS.)

PERTUSSIS. (See WHOOPING-COUGH.)

PHAGEDÆNIC ULCER. (See ULCER, TROPICAL.)

PHLEBOTOMUS FEVER.

Sir Leonard Rogers, M.D., F.R.C.P.

J. A. Hartley¹ describes an outbreak in Egypt in which the incubation period was four to seven days, and troops occupying a camp in which other cases had previously occurred were attacked. J. A. Delmege and C. S. Staddon² record an outbreak in Macedonia in which post-critical rises of temperature resembling a dengue curve were frequent and prostration was often severe. Re-infections of a milder type also were common.

REFERENCES.—¹*Brit. Med. Jour.* 1918, i, 395; ²*Ibid.* 396.

PHTHISIS. (See TUBERCULOSIS, PULMONARY.)

PITUITARY TUMOURS. (See HEAD, SURGERY OF.)

PLAGUE.

Sir Leonard Rogers, M.D., F.R.C.P.

A. Stanley¹ gives a brief account of the last outbreak of pneumonic plague in China, which, like the 1910–11 epidemic, arose in N.W. Manchuria in association with intense cold and overcrowding, while it became less virulent on reaching warmer parts. G. W. P. Dennys² records his experience of rat destruction as an anti-plague measure in the Central Provinces of India, and regards this measure as useless and a waste of money; a conclusion which is disputed by F. N. White,³ whose experience was mainly in the United Provinces. A. V. Gokale⁴ obtained a reduction in the rats by prolonged use of traps in the hill station of the Bombay Presidency. He also found that keeping cats reduced the number of rodents. C. J. Ghia⁵ publishes some practical notes on inoculation against plague. W. M. Willoughby⁶ records plague on two vessels arriving in the Thames.

REFERENCES.—¹*China Med. Jour.* 1918, May, 207; ²*Ind. Med. Gaz.* 1918, Jan. 11, and May, 164; ³*Ibid.* Aug., 281; ⁴*Ibid.* 288; ⁵*Ibid.* 290; ⁶*Lancet*, 1917, ii, 867.

PNEUMONIA.

Arthur Latham, M.D., F.R.C.P.

Prophylactic Inoculation of Man against Lobar Pneumonia.—F. S. Lister,¹ as the result of the experimental inoculation with a specific group vaccine of native mine labourers in South Africa, came to the following conclusions:—

1. From 63 to 77 per cent of all cases of lobar pneumonia, occurring under normal conditions in native mine labourers in the Transvaal, are caused by the pneumococcus of one or other of the groups 'A,' 'B,' or 'C.'

2. Native mine labourers who have been suitably inoculated with a vaccine comprising certain pneumococcal groups are immune from lobar pneumonia due to such groups.

3. Three subcutaneous inoculations of 1 c.c. of a vaccine containing representatives of groups 'A,' 'B,' and 'C,' and having a total content of 7000 million cocci per c.c., have rendered a large native mine population absolutely resistant to pneumonic infection by any of these groups during the observed experimental period of nine months.

4. During the experimental period, when pneumonia due to groups 'A,' 'B,' and 'C' has been completely abolished on the Crown mines, these three groups were still prevalent amongst the pneumonic natives on those mines where inoculation was not practised.

Cecil and Austin,² from a study of the agglutinins and protective power of the serum of forty-two persons vaccinated against the pneumococcus Types I, II, and III, demonstrate that a definite immune response has been secured to Types I and II by the dose of vaccine employed. Little evidence of response to Type III can be demonstrated by these methods, but this is of less significance in that, in animals, it is relatively difficult to secure antibodies against this strain in the serum, even though a considerable degree of active immunity may have been produced in the vaccinated animal. The degree of response to the vaccination appears to be dependent on the total dosage of each type of pneumococcus administered. While some response may be elicited by 2½ billion cocci of each type, a much more constant and greater response follows 13 billion. In subcutaneous administration, the manner in which the total dosage is divided, whether given in a single large dose, in seven small daily doses, or in three to five moderate doses at three- to seven-day intervals, seems to have little influence on the degree of immune response, provided the total dosage is the same. The local and general toxic reaction varies greatly in different persons. The smaller the individual doses, the fewer are the severe reactions. This makes it desirable to divide the total dosage into as many inoculations as circumstances make practicable.

At Camp Upton 12,519 men were vaccinated against pneumococcus Types I, II, and III. Three or four doses were given at intervals of five to seven days, with a total dosage of 6 to 9 billion of Types I and II, and 4½ to 6 billion of Type III. During the ten weeks that elapsed since the vaccination no cases of pneumonia of these three types occurred among the men who had received two or more injections of vaccine. In a control of approximately 20,000 men, there were twenty-six cases of pneumococcus Types I, II, and III pneumonias during the same period. The incidence of pneumococcus Type IV pneumonia and streptococcus pneumonia was much less among the vaccinated troops than among the unvaccinated. No explanation has been advanced for this difference. Small sterile infiltrations disappearing spontaneously, occasionally follow the injection of large doses of pneumococcus vaccine, and appear to be an expression of cutaneous hypersusceptibility. The persons who develop these lesions exhibit local reactions to each dose of vaccine. They also give abnormally marked reactions to intradermal injections of pneumotoxin. They do not, however, exhibit anything notable in the agglutinative or protective powers of their serums after vaccination. Whereas the immune response is characteristically specific for the type of pneumococcus, this reaction is not specific for any type. The authors have found no evidence that Type III is more prone to elicit these severe local reactions than are Types I and II. Prophylactic vaccination against pneumococcus of Types I, II, and III is practical, and apparently gives protection against pneumonia produced by these types. It remains to be determined how long this immunity persists.

Serum Treatment.—It is now established that lobar pneumonia may be caused by at least four different types of pneumococci, and in the case of Type I an antipneumonic Serum is a potent remedy. The following excellent *résumé* of recent additions to our knowledge of the subject is to be found in an article in the *British Medical Journal*³:—

"Analysis of 454 cases of lobar pneumonia in the Rockefeller Hospital during the past five years is of interest in connection with the types of pneumococci which, as will be seen later, have an important bearing on the treatment by

antipneumococcic serum; Type I was responsible for 33 per cent, Type II for 29, Type III for 13, Type IV for 20, and atypical forms of Type II for the small remainder (Stillman). At the Johns Hopkins Hospital, Baltimore, 54 cases of lobar pneumonia, investigated by Clough⁴ between February, 1915, and September, 1916, showed that the percentage incidence of the types of pneumococci agreed very closely with those at the Rockefeller Hospital and elsewhere in America, except for the low percentage of Type II and the correspondingly high percentage of atypical Type II strains, which have only been recognized during the past two years. Incidentally it may be noted that the strain of pneumococcus most frequently found in the pneumonia among the blacks in the Rand, South Africa, appears to belong to Type IV, and that F. S. Lister,⁵ who independently and practically simultaneously (1913) with Dochez and Gillespie in America, separated out four types of pneumococci, has now described four more types of pneumococci in South Africa in addition to those of the American observers.

"With regard to the pneumococci found in the mouths of 50 per cent or more of normal persons, Stillman shows that Type IV predominates, that Type III is frequent, that atypical forms of Type II are occasionally present, and that Types I and II are rare unless the carriers have been in contact with cases of pneumonia due to these types; thus among 184 normal persons intimately associated with Type I or II infections, 11 per cent carried pneumococci of these types, whereas among 297 persons without any history of contact, pneumococci of Types I and II were present in 0.8 per cent only.

"The occurrence of pneumococci in the dust of houses, though of significance in the incidence of the disease, has hitherto attracted little attention. From the dust of rooms inhabited by patients or carriers of Types I or II, pneumococci of the same type may be recovered, whereas in the dust of rooms not so inhabited the predominant pneumococcus is Type IV, Types III, IIb and IIa being also present, whereas Types I and II are very rare. These data justify the conclusion that infection with Types I and II depends upon contact with a case or carrier of these types, the contact being either direct or indirect, that is to say, air-borne from dust.

"An intensive study of blood cultures has been carried out at the Johns Hopkins Hospital by Sutton and Sevier,⁶ who made daily cultures in 66 cases of pneumonia, from admission until the rectal temperature fell below 100°. A striking correspondence was thus brought out between the percentages of the positive blood cultures and of the mortality; in cases of pneumonia due to Type I the percentage of positive blood cultures was 45.8, and that of deaths 41.7, and in pneumonia due to Type IV both percentages worked out at 18.2. Among the cases with persistently negative blood cultures there were three fatal cases only, and two of these had very extensive consolidation. From observation of eleven cases of pneumonia (Type I) treated by antipneumococcic serum at the Johns Hopkins Hospital, Bloomfield⁷ found that the serum prevents the occurrence of hæmic infection, and that it sterilizes the blood when septicæmia has already arisen.

"In an investigation into acidosis and acid excretion, W. W. Palmer⁸ showed that in many severe cases of pneumonia the urine contains a large quantity of an organic acid, the nature and significance of which are being made the subject of further research, but that acidosis as determined by the combined CO₂ in the plasma is seldom, if ever, grave.

"In a paper containing several points of great interest, Dochez and Avery⁹ find that the pneumococcus, which is not known to produce a soluble toxin, and the pathogenic effects of which are supposed to be due to an endotoxin, or to split protein products liberated on its death and disintegration, during

its active growth throws out into the blood of experimental animals and pneumonic patients a soluble substance, possibly analogous to Bail's agglutinins. This soluble substance, which the authors are careful not to call a toxin, as they have not as yet been able to prove with certainty that it is responsible for the intoxication accompanying pneumonia, gives a specific precipitin reaction with the antipneumococcic serum corresponding in type to that of the pneumococcus infecting the patient. In cases persistently excreting the precipitable soluble substance in the urine, resolution of the pneumonia is delayed, and its amount serves as an index of the severity of the infection; cases with large amounts prove fatal, whereas most of the cases that fail to show it recover. This precipitin test is not only of considerable prognostic importance, but it provides a rapid diagnosis of the type of pneumococcus responsible for the patient's pneumonia. Cole,¹⁰ writing, like Dochez and Avery, from the Rockefeller Hospital, but without making any reference to their conclusions, shows that in pneumococcic infection soluble substances (virulin or antiphagin), found especially in pleuritic exudates, but also in the blood, may fix and so remove from the blood the antibodies contained in antipneumococcic serum injected intravenously. In such cases the serum becomes effective only when the soluble substances have been neutralized, and hence in severely infected patients the serum should be injected early and the initial dose should be large. Agglutinin curves, which appear to be an index of any other specific antibodies in the blood, before and after the intravenous administration of serum, may explain why in some instances antipneumococcic serum fails to do good. Other and most important limitations of the serum treatment are: (1) That, as the types of pneumococci have in general a high degree of specificity, a homologous serum is necessary; and (2) That while the immune serum against Type I is of great therapeutic value, the serums corresponding to Type II and others have as yet proved ineffective. The use of antipneumococcic serum should, therefore, be confined to cases of pneumococcic infection proved to be due to Type I. Cole and Moore¹¹ describe in detail the method of manufacturing this serum. Blake's¹² observations throw some light on the mode of action of antipneumococcic serum. As the serum retards the growth and metabolic activities of the corresponding type of pneumococcus, it has been thought that it does so in virtue of an anti-enzymotic (or antiblastic) effect on the surface of the bacteria. But Blake shows that the inhibitory and agglutinating powers run parallel, and that with the removal of the agglutinins the inhibitory influence of the serum disappears. The inhibition of the metabolic activity of pneumococci, therefore, appears to be due to their agglutination and consequent inability to grow in intimate contact with the whole medium.

"In a number of instances intravenous injection of antipneumococcic serum was followed by a sharp reaction and chill, after which the temperature fell, but rose again; this sequence might be repeated after a further injection. Dochez¹³ refers to 65 cases of pneumonia due to pneumococcus (Type I) treated by the homologous serum with a mortality of 7.5 per cent, or a reduction of 17.5 per cent as compared with the mortality of 25 per cent in cases of pneumonia (Type I) treated on ordinary lines. Serum disease is frequent after this treatment; it occurred in 7 out of Bloomfield's 9 cases that lived long enough, was severe in 5, and in a case that received 1100 c.c. a well-marked reaction persisted without intermission for thirty-seven days, in another case for twenty, and in a third for fourteen days. In two cases alarming anaphylactic shock occurred immediately after injection, although no evidence of hypersensitiveness had been given by the preliminary desensitizing injection. Among fifteen patients given antipneumococcic serum at the Peter Bent

Brigham Hospital by Alexander,¹⁴ three were known to be subject to horse asthma and had asthmatic symptoms after the serum, but did not manifest serum disease, even after 350 c.c., whereas the non-asthmatic patients nearly always showed serum reactions."

The Rapid Determination of Pneumococcus Types.—O. W. Mitchell and W. E. Muns,¹⁵ in an attempt to improve tests for pneumococcus differentiation, have devised a method for detecting precipitinogen, derived from pneumococci in the sputum. The test yields valuable and quick results. By its use the injection of a mouse or the use of a culture is unnecessary, and Type I infections may usually be ascertained within an hour or two after the sputum is collected. The sputum is collected in a sterile container. Five c.c. of the sputum are pipetted into a small mortar. Relatively fine sand is added in sufficient quantity to make a rather stiff mixture. The mixture is ground with a pestle for about three minutes to reduce the thick tenacious mass into a gritty fluid paste. Ten c.c. of physiological sodium chloride solution are then added, 2 c.c. at a time. The sputum, sand, and saline are mixed a minute or two, and the sand is allowed to settle to the bottom. After three or four minutes the dissolved sputum collects over the sand and is pipetted off into a clean centrifuge tube. The fluid is usually thin, milky, and uniform, and amounts to about 9 c.c. Ten c.c. of physiological sodium chloride solution are now added to the sand in the mortar. After mixing well, as before, the fluid is pipetted off into a second centrifuge tube. In this manner two solutions of the sputum are provided. The first more concentrated solution may be used for the immediate test, and the second less concentrated solution may be held for use in case of accident to the first. Both solutions are centrifugalized at high speed long enough to clear the fluid completely. This operation requires from five to ten minutes, at 2200 revolutions per minute. The sputum in solution is brought in contact with the three types of antipneumococci serums, 1 c.c. of the former to 0.2 c.c. of the latter. Often the first evidence of a positive reaction is seen a few minutes after the mixing of the serum and the sputum solution. The mixture is a slightly opalescent fluid with a faint smoky 'whirl' on shaking. The disappearance of the 'whirl' seems to be the first phenomenon of specific reaction. Then, on warming in the water-bath for a few minutes, a very slight feathery precipitate may be seen with the naked eye on close examination. The examination may be so facilitated by the use of a lens that the precipitate may be distinctly seen two or three minutes after the mixture of serum and sputum solution is made. As the tubes are left at rest in the water-bath, the feathery white flakes drift to the bottom of the tube and collect in a typical white mass. In a negative test there is no reaction of any kind and very little sedimentation.

Ethylhydrocuprein (Optochin) Treatment.—Moore and Chesney,¹⁶ as the result of two years' experience of the use of *Ethylhydrocuprein*, are satisfied that its systematic use, in the treatment of 75 cases of acute lobar pneumonia due to pneumococci, did not lead to any noteworthy therapeutic benefit. The authors suggest that the failure of the ethylhydrocuprein treatment to influence favourably the course of the disease is probably due to the following: (1) It is impossible to administer a sufficient amount of the drug to produce an effective concentration in the blood-stream without at the same time exposing the patient to the danger of toxic action; (2) The rate of the pneumococidal action of ethylhydrocuprein is too slow in the concentrations which may be attained in the blood-stream of the patient with any degree of safety; pneumococci, therefore, may gain access to the circulating blood at a greater rate than they are destroyed therein even though the serum show pneumococidal action; (3) In the concentrations which are safely attained

in the body fluids, the drug probably penetrates but poorly into the alveolar exudate. The routine use of ethylhydrocuprein in the treatment of acute lobar pneumonia cannot be recommended.

Quinine Urea Hydrochloride Treatment.—Edwin Mathew¹⁷ treated 24 cases of pneumonia with **Quinine Urea Hydrochloride**, by means of intramuscular injections. Fifteen grains were given every three hours as often as seemed necessary, according to the condition of the patient and his temperature. Three doses are given in the first nine hours, and again every three hours if the temperature rises after the initial doses to above 102°. Eight hours after the second or third injection the temperature, pulse-rate, and respiration-rate fall. Twenty-two cases of the series recovered. Mathew considers that quinine urea hydrochloride gives a better chance of recovery to cases of pneumonia with marked toxæmia, and that in all cases its use makes the patient more comfortable, allows natural sleep, and lessens the strain on the heart.

Streptococcus Pneumonia.—A hæmolytic streptococcus appears to cause bronchopneumonia, and in a few cases lobar pneumonia, in epidemic proportions, more especially in connection with measles and influenza. Cole¹⁸ points out the important fact that actively hæmolytic streptococci are found only with the greatest rarity in normal throats except in the presence of epidemics of the so-called streptococcus sore throat or of streptococcus pneumonia. Infection is therefore probably a question of carriers. Isolation of patients suffering from endemic acute lobar pneumonia is of the first importance. This is emphasized by the fact, to which Theobald Smith has drawn attention, that streptococcus infection in man is not self-perpetuating, but a suitable soil is necessary. Given this, streptococci gain rapidly in virulence. Consequently, the time to stop an epidemic of streptococcus bronchopneumonia is at its onset.

Glucose injections in (p. 4).

REFERENCES.—¹*Publications of the S. African Institute of Med. Research*, No. x; ²*Jour. Exper. Med.* 1918, July, 19 (abstr. *Jour. Amer. Med. Assoc.*); ³*Brit. Med. Jour.* 1918, i, 57; ⁴*Johns Hop. Hosp. Bull.* 1917, xxviii, 306; ⁵*Publications of the S. African Institute of Med. Research*, 1913, 1916; ⁶*Johns Hop. Hosp. Bull.* 1917, xxviii, 315; ⁷*Ibid.* 301; ⁸*Jour. Exper. Med.* 1917, xxvi, 495; ⁹*Ibid.* 477; ¹⁰*Ibid.* 453; ¹¹*Ibid.* 537; ¹²*Ibid.* 563; ¹³"Serum Treatment of Pneumococcus Infections," Musser and Kelly's *Practical Treatment*, 1917, iv, 225; ¹⁴*Arch. Int. Med.* 1917, xx, 636; ¹⁵*Jour. Med. Research*, 1917, xxxvii, No. 2, 339; ¹⁶*Arch. Int. Med.* 1918, xxi, No. 5; ¹⁷*Edin. Med. Jour.* 1918, 227; ¹⁸*Jour. Amer. Med. Assoc.* 1918, ii, 635.

PNEUMONIA IN CHILDREN.

Frederick Langmead, M.D., F.R.C.P.

Hess,¹ writing on unresolved pneumonia, points out that the diagnosis of non-tuberculous interstitial pneumonia should always be made with great caution, and after excluding all other conditions producing similar physical signs; that tuberculosis is frequently a complication, if not the primary factor in many fatal cases, and a prominent cause of non-resolution in cases which recover. Empyema, especially of the intralobar type, must be considered and watched for, whilst the rarer causes, such as syphilis, foreign body, new growths (metastatic and primary), must not be overlooked.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1917, ii, 1562.

PNEUMOTHORAX. (See THORAX.)

POISONING, GAS. (See GAS POISONING.)

POLIOMYELITIS, ACUTE.

J. Ramsay Hunt, M.D.

During the great epidemic of poliomyelitis in New York City in the summer of 1916, Rosenow and his collaborators isolated a streptococcus from the tonsils of infected patients, which in rabbits and guinea-pigs showed an elective

affinity for the central nervous system, with the production of the lesions of poliomyelitis.

Subsequent research at the hands of these investigators seemed to strengthen the etiological importance of this discovery, which was confirmed by other writers in the same field. It is, however, only fair to state that so important a source as the Rockefeller Laboratory, which has contributed so much to our knowledge of poliomyelitis, does not regard these organisms as specific in the sense of being the causative factor of poliomyelitis. Nevertheless, Rosenow and others have continued their studies, and in the epidemic of 1917 in Chicago have used an **Immune Horse Serum** in the treatment of the disease, apparently with very favourable results. As this treatment, administered with all care, is not attended by any untoward results, it should be given consideration, even although its scientific basis is not accepted by all investigators.

This treatment is advocated by E. C. Rosenow¹ on the basis of his bacteriological and experimental studies, reinforced by the results obtained in clinical cases by himself and others.

The demonstration that the somewhat peculiar streptococcus, isolated in poliomyelitis from time to time by various observers, has elective affinity for the central nervous system of young rabbits and guinea-pigs, producing symptoms and lesions resembling poliomyelitis in man, indicated that this organism was to be regarded as of real etiological importance.

The possibility of developing a curative serum for poliomyelitis with this organism was first suggested in the experiments by Rosenow, Towne, and Wheeler, in which monkeys were protected against injections of virulent virus, and experiments in the immunization of horses were instituted.

The serum from a horse injected with freshly isolated strains from experimental poliomyelitis in monkeys, was found to protect monkeys against inoculation of virus, to have definite curative effects in monkeys after the onset of paralysis, and apparently a powerful curative action in poliomyelitis in man. In a preliminary report on the treatment of 44 cases, these statements appear: All of the 16 patients treated before paralysis had begun recovered without paralysis. . . . The apparent good effects from the injection of serum are often striking. The headache, nervousness, restlessness, and tremor often disappear promptly. The temperature and pulse-rate are lowered. A beginning paralysis often disappears in an astonishingly short time. A rapidly progressing paralysis is often arrested, and improvement is unusually rapid. The post-paralytic pains do not appear, or are comparatively mild.

The serum used in the sporadic cases here reported, as in an earlier series of cases of epidemic poliomyelitis, was injected intravenously and not intraspinally, as it had been found that intravenous injections were necessary to protect monkeys against intracerebral inoculations of virus.

After reporting the cases and detailing the experimental evidence, he states that the results in acute sporadic poliomyelitis, as in the epidemic form of the disease, and in experimental poliomyelitis in the rabbit, are so strikingly favourable as to leave little doubt regarding the value of this treatment. Therefore, the importance of recognizing poliomyelitis early is evident, so that the serum may be given without delay.

Nuzum and Willy,² who have worked along similar lines, report on the result of 159 cases treated with antipoliomyelitic horse serum, also with favourable results. They treat all cases as early as possible with relatively large doses of serum. Obviously the amount of serum that can be safely given to a child intraspinally is small. Accordingly, they have regularly injected small doses of from 5 to 10 c.c. of serum very slowly by the gravity method after the previous withdrawal of an equal or greater amount of spinal fluid. At the same

time intravenous doses of from 10 to 30 c.c. of serum were given according to the age of the patient. In many patients they repeated the intravenous injections at twelve to twenty-four hour intervals, using the temperature as a guide to dosage, with beneficial results. The majority of patients received total amounts of serum varying from 40 to 75 c.c., depending on the age and severity of the case. Of the 159 patients 19 died—a mortality of 11.9 per cent. Among 100 cases occurring during the same period, in which the patients did not receive serum, the mortality was 38 per cent. They treated 152 patients in all stages of infantile paralysis—excluding 7 cases presenting respiratory paralysis on admission—with 11 deaths—7.2 per cent. During this same period 301 cases were reported to the Health Department with 97 deaths—32 per cent. This series suffices to demonstrate the harmlessness of serum treatment when the serum is free from hæmoglobin, sterile to repeated cultures, and the injections are slowly made and all known rules of precaution are observed. The serum appears to possess the power of definitely preventing the onset of paralysis when administered early in the disease. In 10 undoubted instances of poliomyelitis in which no paralysis was detected at the time serum was administered, prevention of paralysis and complete recovery resulted in 100 per cent. The action of the serum is more definite in arresting the extension of paralysis and diminishing the severity than in effecting its disappearance. The earlier the serum is administered, the more striking the results. It should be injected intraspinally in small doses and at the same time intravenously in larger amounts. The temperature has been employed as a guide to the dosage. The injection is followed by a critical fall in the patient's temperature. Coincident with this there occurs a slowing of the pulse-rate, and usually other definite clinical evidence of general improvement. In doubtful early cases the decision to use serum should rest on the bacteriological, chemical, and microscopical examination of the cerebrospinal fluid.

The Cerebrospinal Fluid in Acute Anterior Poliomyelitis.—For the early diagnosis of this affection the changes in the spinal fluid are assuming considerable importance. This is especially true when the disease is present in epidemic form and mild abortive cases are frequent. Then the spinal fluid is of the greatest moment. Careful histological studies of the spinal meninges and cords of early experimental and human poliomyelitis infections have shown that the primary reaction of the nervous system is the production of an acute meningitis characterized by hyperæmia, œdema, and perivascular round-cell infiltration in the pia mater, with subsequent extension into the substance of the cord and involvement of the anterior-horn cells. The spinal fluid may be altered by the passage into it of cells from the perivascular and interstitial exudate in the meninges, and of serum constituents derived from the hyperæmic blood-vessels.

The investigations of Gay and Lucas have shown that the total cell-count of the fluid is increased considerably above the normal, the majority of the cells being of the mononuclear variety. Flexner and Lewis, in a study of the spinal fluid from a monkey after inoculation with the virus, found a considerable increase in the number of cells twenty-four hours after inoculation, and particularly a small cell slightly larger than a lymphocyte, showing a polyform nucleus. In a thorough study of 233 fluids from 69 cases, Peabody, Draper, and Dochez found an increased cell-count, with a low or normal globulin content, in fluids taken during the early days of the disease and before the onset of paralysis; at this time the polymorphonuclear cells amounted to 90 per cent of the total, although most fluids showed almost exclusively lymphocytes and large mononuclear cells. According to these investigators, analogous

changes may be found in the spinal fluid of abortive cases ; all fluids examined reduced Fehling's solution.

During the recent epidemic of poliomyelitis in Philadelphia, Kolmer, Freese, and Matsunami² examined 868 specimens of cerebrospinal fluid from cases of epidemic poliomyelitis. They conclude that a definite and absolute diagnostic criterion or laboratory test with the cerebrospinal fluid has not been discovered. A clear or slightly opalescent fluid flowing under increased pressure, sterile as examined by smear and culture when collected aseptically, poor in fibrin, reducing Fehling's solution, and containing an increased number of cells chiefly of the mononuclear variety, are the most constant findings. An increase of protein and a high potassium permanganate reduction index strengthen the diagnosis, while a colloidal gold reaction of the luetic and meningitic zone types and the presence of natural anti-sheep hemolysin are helpful diagnostic data.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1918, ii, 433 ; ²*Ibid.* 1917, ii, 1247 ; ³*Amer. Jour. Med. Sci.* 1917, ii, 720.

POLYPUS. (*See NOSE.*)

PREGNANCY, PYELITIS DURING. (*See PYELITIS.*)

PREGNANCY, VOMITING OF.

W. E. Fothergill, M.D.

TREATMENT.—C. S. Bacon¹ finds that with patients under control, the induction of abortion is practically never needed in cases of hyperemesis gravidarum. Treatment should be started early, the patient being confined to bed. At first, nothing should be given by the mouth, not even water. A large enema should be given every day, and should contain 5-1000 of **Sodium Chloride** in order that some of the water may be absorbed. This cleansing enema may be given at 7 or 8 a.m. Nutrient enemata are to be given at intervals during the day, and it may be well to add 10 drops of **Tincture of Opium** to the last given in the evening. No attempt should be made to give undigested proteins, but amino-acids and peptones dialyzed from artificially digested meat or milk may be used. Because sugar and starch digestion does not take place in the colon, carbohydrates should be given in the form of **Glucose**, which is absorbed unchanged. As the absorption of fats is doubtful, they should be omitted. **Alcohol** is very valuable, as being more readily utilized than other energy foods. It is more easily absorbed than glucose, and it helps to check fermentation in the colon. If given too strong or in too large quantity, it may injure the tissues and may be returned instead of being absorbed. It should therefore be given in a 5 per cent solution, and if not more than 3 oz. per diem is given it is practically all consumed and used. A similar quantity of glucose is given. A solution for rectal feeding is suggested: glucose, 50 ; alcohol, 50 ; calcium chloride, 0.3 ; sodium bicarbonate, 3 ; sodium chloride or bromide, 4 ; distilled water to make 1000. If 1500 c.c. of this mixture are given each day, the patient will receive 825 calories. Mouth feeding is cautiously started after retching has stopped and when thirst has disappeared.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1918, i, 1750.

PROLAPSE, GENITAL. (*See GENITAL PROLAPSE.*)

PROSTATE, DISEASES OF.

J. W. Thomson Walker, M.B., F.R.C.S.

Deaver¹ finds that cases suffering from prostatic symptoms fall into three groups, "depending upon the local condition of the lower urinary tract, and upon the degree of renal and cardiac defects." *Group 1* includes cases of early prostatic hypertrophy in which the bladder capacity is approximately normal,

with small amounts of infected or non-infected residual urine, normal kidney function, and no serious organic defects in the heart or blood-vessels. Cases of this kind may be operated upon after the preliminary examination.

Group 2 comprises cases in a later stage, with or without marked systemic symptoms. There is a large amount of residual urine, which may or may not be infected. The bladder walls are atonic, and diminution in the kidney function dependent on back pressure is present. The patients may be fair surgical risks, and may even become good risks with proper preliminary treatment. The pre-operative treatment is designed to relieve back pressure. It consists in intermittent catheterization, and tying in a catheter or suprapubic cystostomy in some cases.

Group 3 is made up of cases in which there is a small contracted, ulcerated bladder infection, and sometimes also dilatation of the kidneys. There may be stricture of the bladder neck, or an adenomatous collar or ball-valve. The bladder contains little or no residual urine. The vitality of these patients is low. Prostatectomy is not infrequently a complete failure. Sedatives and tonics are important, and drainage of the bladder is frequently necessary.

The mechanism of retention of urine in prostatic adenoma is discussed by Hyman.² The site of obstruction has been placed by some observers at the neck of the bladder, being due to an elevated prominence on the floor of the urethra at this spot. This is said to interfere with the normal action of the internal sphincter and produces retention. Compression of the urethra by enlarged lateral lobes is said to cause retention, but the posterior urethra is often dilated in adenomatous enlargement of the prostate.

In the small number of cases where there is a distinct pedunculated median lobe or hypertrophied submucous glands on the posterior lip of the internal meatus, the nature of the obstruction is obvious. In the larger group of prostatic hypertrophies, the mechanism is different. With the posterior urethroscope the enlarged lobes are seen as two masses on either side of the urethra. When the patients strain during efforts of micturition, the lateral lobes come into apposition and obliterate the lumen of the urethra.

Pauchet³ states that after suprapubic prostatectomy, the wound closes in from three to eight weeks, and cicatrization is longer when the operation has been done in two stages. He suggests systematic closure of the wound. After the operation, a suprapubic drain is introduced and remains in place for nine days. On the tenth day it is removed and replaced by a ureteral catheter for three days. The suprapubic wound can then be sutured. After the suture, a fresh catheter is placed in the urethra for eight days. On the twenty-first or twenty-second day this catheter is removed at the same time as the suprapubic stitches.

Barragan⁴ reviews his experiences with 36 cases of inflammatory processes in the prostate resulting from catheter infection and other causes. In diagnosis he insists on the importance of disturbance in defecation, the call occurring almost as incessantly as the desire for micturition, and the act causing intense pain. The pain in acute prostatitis is localized in the depths of the perineum and in the anal region, spreading to the lumbar and sacral regions. Catheterization should be attempted only in men accustomed to the use of the catheter, and in cases of acute retention. Under rest in bed, with hot rectal irrigation every eight hours, sitz baths, and light diet, the symptoms subside. If they persist there is probably an abscess forming, and prompt operative relief is called for unless the origin of the prostatitis is urethral. In this case expectant treatment is advisable for a time, as the abscess may meanwhile rupture into the urethra. The perineal route for operation is the best. The after-care is the same as for acute prostatitis, and is very important. Tuber-

culous lesions in the prostate resemble other forms of prostatitis, except that initial or terminal hæmaturia is frequent.

In a study of infection in prostatic cases, Judd⁵ says a definite reaction occurs during pre-operative treatment by bladder drainage, by catheter, or by suprapubic puncture. In some cases this reaction may be due to infection of the kidney. Several days after the beginning of treatment or after the operation has been performed, the urine shows a considerable number of colon bacilli in a large majority of cases. This cannot be due to contamination in every instance, although we are unable to say whether it comes from the kidney, the bladder, or the prostate itself. The infection may be walled off in the kidney, and therefore no organisms show in the urine. Simultaneously with any form of treatment, the infection becomes active and the urine immediately shows bacteria. Colon bacillus vaccine may modify the infection, though it does not decrease the number of colon bacilli in the urine.

Bumpus⁶ gives a report on *bacterial vaccine therapy* in a series of cases of prostatectomy. He states that "at first we were very enthusiastic; subsequently we became sceptical; and after the completion of a tabulated list of prostatectomies with and without vaccine we discontinued administration of vaccine." He further concludes that immunity to pyelonephritis by means of mixed colon bacillus vaccine cannot be produced. Administration of mixed colon vaccine does not markedly reduce the incidence of genito-urinary infection, if it affects it at all. Pre-operative attacks of pyelonephritis are the natural means of producing an immunity to renal infection, and their occurrence makes operative risks less. The length of convalescence is usually in inverse proportion to the length of pre-operative treatment.

Martin⁷ gives a comparative analysis of the end-results of 55 cases of suprapubic and 55 of perineal prostatectomy, from which a few figures may be quoted. In the suprapubic cases, 61.2 per cent healed within four weeks, while 42 per cent of the perineal cases were healed in a like period; 93.8 per cent of suprapubic cases were healed within three months, and 100 per cent within a year, while 66 per cent of perineal cases were healed in three months, and only 84 per cent within a year. Six per cent of the perineal cases were left with a permanent fistula. Of the suprapubic cases, 80.5 per cent had full control, 15.2 per cent partial control, and 4.3 per cent complete incontinence. Of the perineal cases, 64 per cent had full control, 22 per cent partial control, and 14 per cent complete incontinence.

Floderus⁸ holds that cancer of the prostate should be suspected whenever an elderly man complains of disturbance of micturition, or pain in the lower abdomen, or sciatica, and also whenever the prostate is enlarged. Both cancer and adenoma may exist side by side, and for years the clinical picture may be that of a hypertrophied prostate.

The author found that in 800 cases of enlargement of the prostate there were 80 malignant cases, that is 10 per cent; and the ages ranged from fifty to eighty-five. Extension to the seminal vesicles and bladder, and compression of the ureters with hydronephrosis, might follow, and metastasis occurred generally by way of the blood or urine, metastatic deposits being more common in bones than in other tissues. The Bottini method of galvano-cauterization gave great relief in some inoperable cases. Prostatectomy is most promising in the doubtful incipient cases, but had ensured a permanent cure in some fully developed cases. Suprapubic enucleation was the best method for early cases, and Young's operation in the most advanced. He recommends the use of radium after operation and in inoperable cases. The clinical course in these cases ranged from two and a half months to eleven years.

Young⁹ describes a modification of his radical operation for carcinoma of

the prostate. The operation consists of the removal of the prostate and its sheath, the prostatic urethra and part of the membrane urethra, the base of the bladder anterior to the ureteric orifices, and the seminal vesicles. This operation is followed by complete incontinence in most cases. Young modifies the operation by dissecting inside the anterior and lateral portion of the prostatic sheath, and leaving these intact instead of removing the whole sheath. By this means he states that the important blood-vessels and the nerves to the compressor urethræ which lie above it are preserved, and post-operative continence of urine is obtained.

REFERENCES.—¹*Ann. Surg.* 1917, Sept., 371; ²*Ibid.* 1917, April, 493; ³*Presse Méd.* 1917, Dec. 27, 729; ⁴*Jour. Amer. Med. Assoc.* 1918, Feb. 9, 424; ⁵*Ann. Surg.* 1917, Sept., 362; ⁶*Jour. Amer. Med. Assoc.* 1918, Jan. 26, 213; ⁷*Ibid.* 1918, May 4, 1287; ⁸*Ibid.* 1917, Sept. 15, 858; ⁹*Ibid.* 1917, Nov. 10, 1591.

PRURITUS.

E. Graham Little, M.D., F.R.C.P.

Some useful formulæ for the local treatment of this condition are contributed by Darier. The following lotions are to be applied by swabbing :—

R	Glycerin	50 grms.	Camphorated Spirit	
	Vinegar		Aq. Laurocerasi	each 100 grms.
	For use, this is diluted with from 4 to 10 parts of hot water.			
R	Cocaine Hydrochloride		Alcohol	20 grms.
	Chloral Hydrate		Aq. Laurocerasi	30 grms.
	Resorcin	of each 1 gm.	Water	44 grms.
	Glycerin	5 grms.		

Ointments sometimes afford considerable relief. Pure lard, pure vaseline, or a simple salve will sometimes be sufficient; but, as a rule, it is better to use sapolan, naphthalan, or pure cod-liver oil made up into ointment, or preferably in collosol form. With ointments or pastes it is often of great advantage to add antipruriginous substances. Tartaric acid (5 per cent) in glycerin of starch, or menthol 1, chloroform 2.5, and camphorated oil of camomile 100. Anesthésine in lanolin cream (10 to 30 per cent.) with the addition of alcohol or of olive oil (10 to 30 per cent). A useful ointment is composed of :—

R	Menthol	1 gm.	Lanolin	35 grms.
	Chloral Hydrate		Vaseline	50 grms.
	Camphor (in powder)	of ea. 5 grms.		

If a paste is more suited for application, the following is recommended :—

R	Menthol	0.50 grms.	Tuménol	5 grms.
	Phenol	1 gm.	Lassar's Zinc Paste	90 grms.
	Salicylic Acid	2 grms.		

Cod-liver oil ointment—

R	Cod-liver Oil	5 to 30 grms.	Paraffin	8 grms.
	White Oil	5 to 25 grms.	Aq. Rosæ	
	White Wax	5 grms.	Aq. Laurocerasi	of each 10 grms.

After application, to be powdered over with talc.

Sheltering the affected surface from the air is sometimes a most effective method of treatment. Ointments and paste probably act in this way to a great extent. For the purpose zinc pastes are most practicable, being applicable over a large extent of surface—

R	Gelatin		Glycerin	25 grms.
	Zinc Oxide	of each 15 grms.	Water	55 grms.

The mass is liquefied in a *bain-marie*, and applied with a camel's-hair brush. A layer of absorbent wool is then applied. Ichthyol and other active bodies may be incorporated, but it is better to apply them over the surface, and then to cover up with the paste.

REFERENCE.—*Jour. de Méd. et Chir. Prat.* 1918, Aug. 10 (abst. *Pract.* 1918, Oct., 238).

PSORIASIS.

E. Graham Little, M.D., F.R.C.P.

De Silva¹ praises X rays and Chlorine Ionization as the two most powerful means for reduction of patches of chronic psoriasis, and of the two prefers ionization, given at weekly intervals. No details are supplied as to the method of administration.

Barber² gives the following detailed directions for treatment of psoriasis in different situations on the person.

1. *Treatment of a Generalized Eruption on the Body and Limbs.*—The patient attends for treatment twice daily. Every morning he is given a bath, to which on the first two days Cresol (1 oz. to an ordinary-sized bath) and an Alkali (a handful of sodium or potassium carbonate) are added; on subsequent mornings the cresol is omitted. After the morning bath, and again in the evening, the following ointment is applied to all affected parts from the neck downwards, excepting the genitals:—

R	Chrysarobin.	gr. x	Zinc. Oxid.	℥iiss
	Acid. Salicyl.	gr. xv	Lanolin.	
	Acid. Carbolic.	gr. x	Vaselin.	āā ad ℥j

Throughout the period of treatment a suit of pyjamas is worn next the skin night and day, and thus becomes thoroughly impregnated with the ointment. The patient is inspected by the medical officer at least every second day.

As a rule the ointment is well tolerated, but should any area of skin become acutely inflamed and tender, the application of the ointment to that part is at once discontinued, and, instead, some soothing preparation, such as **Lassar's Paste** (to which a little ichthyol may well be added), is kept thickly applied to the affected region. The genitals are throughout protected by Lassar's paste.

At the end of a week, sometimes earlier, the eruption in most cases is to a large extent cleared, whereupon Lassar's paste, containing 10 gr. of salicylic acid to the ounce, is applied to the treated parts, to allay irritation and assist desquamation. A clean suit of pyjamas is at the same time issued to the patient, and at this stage a bath on alternate days only is given.

2. *Treatment of Resistant Patches.*—It will usually be found that a few active patches remain after the greater part of the eruption has disappeared. Such areas are commonly seen on the elbows and knees, wrists and hands, in the hollows just behind the great trochanters, and sometimes elsewhere. In the treatment of these a stronger ointment is employed as follows:—

R	Chrysarobin.	gr. xx	Zinc. Oxid.	℥iiss
	Acid. Salicyl.	gr. xxv	Lanolin.	
	Acid. Carbol.	gr. x	Vaselin.	āā ad ℥j

This is rubbed well into the patches twice daily, and is also kept applied to them on lint during the night, providing that the healthy skin immediately surrounding them is not actively inflamed.

3. *Treatment of the Scalp and Forehead.*—In order to prevent the occurrence of conjunctivitis, the chrysarobin ointment is not used for these parts. The hair is cut very short, and the scalp shampooed three times a week. An ointment of the following composition is kept applied by means of lint or, better, a closely-fitting linen cap:—

R	Acid. Pyrogal.	gr. x	Acid. Carbol.	gr. x
	Acid. Salicyl.	gr. xv	Ung. Hyd. Ox. Flav.	℥j

4. *Treatment of the Face and Front of the Neck.*—As a rule, psoriasis of these regions will yield to zinc ointment containing 10 gr. of ammoniated mercury and 20 to 30 gr. of salicylic acid. In more resistant cases the pyrogallie acid ointment, as recommended for the scalp, has proved effectual.

The insistence on **Carbolic Acid** in all these formulæ is to be noted. The author considers it has a specific effect, whether locally or due to absorption cannot be decided.

Chrysarobin dermatitis occasionally causes trouble, and may be treated with the following mixture :—

R	Sod. Citrat.	5ij	Sod. Bicarb.	gr. xv
	Pot. Carb.	gr. xv	Aq.	ad 3j
		Sig.—Ter die. a.c.		

Attention to the state of the teeth is recommended, as there was evidence of mouth sepsis in several instances of the disease. Very inflammatory eruptions should be treated at first with sedative ointments, such as **Lassar's Paste**, until the inflammation has subsided, when the treatment detailed above may be cautiously instituted. Much less importance is attached to internal treatment, but a mixture containing **Vinum Antimoniale** and **Potassium Citrate** may be prescribed with some benefit.

Intramuscular injections of **Sulphur** were mentioned in the **MEDICAL ANNUAL**, 1918, p. 437. An improved formula has been devised for these by Gougerot and Duret³ :—

R	Precip. Sulph. (washed)	0.002 grm.	Eucalyptol	0.20 grm.
	Guaiacol (crystallized)	0.10 grm.	Olive Oil (purified and sterilized)	
	Camphor (refined)	0.10 grm.	to make 1 c.c.	

The sulphur is dissolved in the oil by gentle heat, and whilst still warm, this solution is poured into the mixture previously made of the camphor and guaiacol, and then the eucalyptol. The oily solution of sulphur must not be allowed to get cool, for some of the sulphur precipitates in that case. The preparation so obtained remains stable at ordinary temperatures, and an injection of 3 c.c., afterwards 5 c.c., is practically painless, owing to the lasting analgesic effect of the combination of camphor and guaiacol.

REFERENCES.—¹*Brit. Med. Jour.* 1918, i, 9 ; ²*Ibid.* 369 ; ³*Pract.* 1917, 394.

PUERPERAL INFECTION.

W. E. Pothergill, M.D.

TREATMENT.—Miller and Chalfant¹ have tried injections of **Arsenobenzol** in eleven cases of puerperal septicæmia, hoping that the effect upon streptococci in the blood-stream would be superior to that of the drugs previously tried, such as collargol, formalin, colloidal gold, and eusol. In their early cases a blood-culture was taken and a white count was made, but the first injection was not given until the laboratory report showed that the blood contained organisms. This entailed two or three days' delay. Therefore, in the later cases, when there was clinical evidence of a blood-stream infection, 6 mgrms. of arsenobenzol were given at once. There was a considerable increase in the number of leucocytes in the twenty-four hours following arsenobenzol. A drop in the number of leucocytes without a corresponding fall in temperature was taken as an indication for another injection. A second blood-culture taken twenty-four hours after arsenobenzol was, with two exceptions, free from organisms. Five patients had only 1 dose, three had 2, one had 3, and two had 4 doses. In the eleven cases there were four fatal results. Two patients each had one chill after injection, and all had a transient mild albuminuria. There were no other toxic manifestations.

The writers do not think this treatment is applicable to cases of thrombophlebitis, localized abscess, or pelvic cellulitis of long standing, for in such cases there is repeated infection of the blood-stream. They think it will be of value in cases of true septicæmia with little or no evidence of local lesions. It is in this type of case that the mortality has been highest hitherto.

The cases are reported in detail, and the writers conclude : (1) With the use

of intravenous injections of arsenobenzol we have been able in every instance to rid the blood-stream of its invading organism. (2) All varieties of organisms we have so far encountered seem to be equally influenced. (3) Cultures from localized abscesses are usually identical with cultures from the blood-stream. Cultures from the uterus, although this same organism is predominant, are rarely pure cultures. (4) Re-infections from focal infections may and do occur, but are not so readily influenced by the arsenobenzol as the original infections. (5) The leucocyte count is usually low in comparison with the temperature and pulse. After arsenobenzol has been given there is a marked increase in the count. If, after this time, there is a decided decrease in the leucocyte count without a corresponding improvement in the patient, it is probable that the patient has re-infected herself, and arsenobenzol may be given without waiting for confirmation of this by laboratory report. (6) In the cases we have had, the blood-stream is usually found to be sterile in twenty-four hours, always in forty-eight hours. (7) Rabbit experiments made by Dr. C. S. Allison would indicate that a dose of 6 mgrms. is necessary to secure prompt results. (8) In suspected blood-stream infections, arsenobenzol may be given immediately after a culture has been taken, in order to avoid the delay incident upon waiting for a laboratory report.

REFERENCES.—¹*Amer. Jour. Obst.*, 1918, Sept., 395.

PULMONARY ABSCESS. (See LUNG, AFFECTIONS OF.)

PULMONARY TUBERCULOSIS. (See TUBERCULOSIS, PULMONARY.)

Garlic recommended for inhalation (*p.* 3); see also Stannoxy (*p.* 7); and X-rays as a means of early diagnosis (*pp.* 27 and 32).

PYELITIS DURING PREGNANCY.

W. E. Fothergill, M.D.

F. H. Smith¹ finds that in many cases some distant focus has antedated the urinary infection. Tonsillitis, otitis, pyorrhœa alveolaris, cholecystitis, appendicitis, and salpingitis are examples of distant foci, but the intestine is by far the most frequent source of infection and the *Bacillus coli* is the organism usually found. Franke has demonstrated an actual direct connection through the lymphatics between the colon and the right kidney, which explains the preponderance of right pyelitis.

TREATMENT.—The writer strongly condemns the indiscriminate use of hexamine, and notes the difficulty of making the urine sufficiently acid to admit of the action of this drug. He emphasizes the value of alkalization by Potassium Citrate pushed so as to keep the urine alkaline for a week or ten days after all symptoms have disappeared. Fifteen to 20 gr. every two hours during the day, and every three or four hours during the night, may be required. The writer advises the subsequent use of autogenous vaccines in cases in which pus persists in the urine after symptoms have disappeared.

(See also MEDICAL ANNUAL, 1917, p. 422.)

REFERENCE.—¹*Amer. Jour. Med. Sci.* 1918, i, 392.

PYLORUS, HYPERTROPHIC STENOSIS OF.

Frederick Langmead, M.D., F.R.C.P.

L. Emmett Holt,¹ writing from a study of 141 cases, of which 77 ended in recovery, recognizes no division between pyloric spasm and pyloric hypertrophy. He is of opinion that the hypertrophy precedes the spasm, and considers it absolutely proved that the hypertrophy continues long after the spasm has subsided. A palpable tumour, though not essential to the diagnosis, can usually be found by a careful observer under favourable conditions.

The degree of gastric retention is easily estimated by emptying the stomach two, three, or four hours after a test meal by means of a simple suction apparatus composed of a rubber catheter, a small laboratory wash-bottle, and a suction-tube. The test meal employed has been 2 to 3 oz. of breast-milk; diluted condensed milk answers the purpose, but mixtures of unboiled cow's milk may block the tube by clotting.

DIAGNOSIS.—He places the following features in their order of importance: (1) The history, if obtained from a reliable mother or nurse; (2) Abnormal gastric retention, observations being repeated four or five times at least; (3) Peristaltic waves: of no diagnostic value unless classical; (4) A palpable tumour; (5) Wasting, constipation, scanty urine, etc. It is doubtful whether *x* rays tell more than can be learnt by careful observation, and the patients bear the incidental manipulations very badly.

TREATMENT.—This consists in careful feeding and stomach-washing. The **Gastric Lavage** should at first be done twice a day, and the water used should be as warm as 112°. Breast-milk is the optimum food, but one not rich in fats is desirable. Weaning is most unwise. In default of breast-milk, a milk mixture weak in fats should be employed. In greatly prostrated infants **Hypodermolysis** should be used daily, and from 150 to 250 c.c. of 4 per cent dextrose may be given in a saline solution at one time. Rectal feeding is of little value, nor has he any faith in drugs or local applications of heat over the epigastrium for the purpose of allaying spasm.

Since January, 1915, the operation he has employed exclusively is that of Rammstedt, which consists of simply dividing the circular muscular layer of the pylorus by external incision. Of 41 gastro-enterostomies the mortality was 51 per cent; of 28 cases in which the operation was performed by Downes the mortality was 43 per cent; of 67 cases in which the Rammstedt operation was performed by the same surgeon the mortality was but 24 per cent. The advantages are the short time taken (seldom more than fifteen minutes, and often only ten), the absence of risks of non-union, leakage, and peritonitis, and the slight amount of handling of the viscera. The shock is also much less severe, the temperature reaction less marked, food can be increased more rapidly, and disturbances of digestion, particularly diarrhoea, are very much less frequent and severe.

The success of operative measures is dependent, in no small degree, upon the after-treatment, and it is of the utmost importance that the skilled surgeon should be assisted at this stage by one equally skilled in post-operative management.

He thinks that the protagonists for medical and surgical treatment respectively are not always speaking of the same condition. There are other conditions in infancy with many of the same symptoms. A large proportion of such cases recover with medical treatment only, as do also most of those of hypertrophic stenosis of the milder form. With the possibilities of the best care and the most intelligent feeding—particularly breast-feeding,—if the weight is stationary or the loss not great and the child is in good condition; if the vomiting is only two or three times a day, if the stools are fecal, and if no surgeon with special experience is available, one is justified in waiting. On the contrary, if the weight has fallen to 6 lb. or below, and the loss is still going on; if the vomiting is continuous, if there is marked gastric retention, if the stools contain no fecal matter, no time should be lost, but immediate operation advised—particularly in a hospital—whether a tumour is palpable or not.

During a period in which medical treatment was given a prolonged trial, and operation only resorted to as a last hope, the mortality was 58 per cent

of 41 cases, the medical and surgical failures being equal. Of 67 cases in which Rammstedt's operation was employed, 51 infants recovered.

C. G. Grulee² has also found *x* rays of little value in diagnosis. Antiperistalsis, often spoken of in such cases, was very unusual in his series of eighteen, and no relationship could be made out between antiperistalsis and vomiting. In contradistinction to Holt, he recognizes pylorospasm as an entity, from which pyloric hypertrophy has to be distinguished. Other very rare conditions which may resemble it are a shortened ligament kinking the bowel beyond the pylorus, and a small tumour projecting into the pyloric orifice. He takes the view that if the diagnosis has been arrived at, operation should be done. It is usually wise, within six hours after operation, to attempt to give some water by the mouth, followed within two hours by a small amount—say half an ounce—of breast-milk. Vomiting of a small amount of greenish fluid almost always occurs, but the milk is not often returned. Feeding should not be oftener than every four hours. He employs as accessories **Rectal Enemata** and **Rectal Alimentation**. There is no advantage in giving drugs, other than **Stimulants**, after operation.

REFERENCES.—¹*Brit. Jour. Child. Dis.* 1917, July, 161; ²*Cleveland Med. Jour.* 1917, xvi (abst. *Surg. Gyn. and Obst.* 1917; 516).

RECTAL CRISES, NON-TABETIC.

Robert Hutchison, M.D., F.R.C.P.

MacLennan¹ describes cases of 'rectal crises' in non-tabetic subjects which have been hitherto unrecognized. He justifies the use of the term 'crises' as applied to them, by the severity of the pain and its sudden onset. Both sexes are liable, but males more than females. The ages of the patients range from 16 to 50. The pain is of extreme severity and located in the sacral region.

The crisis commonly arises during defecation, especially if accompanied by straining. On the other hand, the victim may be awakened from a sound sleep by the rapidly growing pain. Tenesmus is present, and the act of defecation, though at first it causes an exacerbation of the suffering, results in its cessation. In men the crisis may be accompanied by priapism. Women who have borne children state that the pains of childbirth are not comparable in severity with those occurring in this manner. One individual after his first attack avowed his intention of never going to bed without having a morphia suppository at hand. In two others syncope supervened to give relief. The fall resulting from this loss of consciousness caused in one a fracture of the nose, which brought the patient under observation. Short of syncope, the pulse becomes enfeebled to a greater or less degree.

When the crisis had reached its zenith the onset of a general tremor or rigor, accompanied by the sensation of cold, is almost invariably followed by a rapid cessation of the pain. The pain may wax and wane, but the most severe attacks are often the shortest.

Examination of the rectum during the attack has demonstrated in two cases the presence of a fine fibrillar tremor in the internal sphincter. Piles may be present, and undoubtedly enter into the etiology.

The lesion is certainly a neurosis, though it affects persons not of a neurotic temperament and otherwise in sound health. In no case examined during the pain has the rectum been found quite empty, and constipation of a minor degree has been the rule.

The treatment he has found most efficacious has been the inhalation of a dozen drops of **Chloroform** placed on a handkerchief. For those who suffer periodically the chloroform vaporoles made by Messrs. Burroughs, Wellcome & Co. will be found convenient. Each contains 3 minims; hence they may safely be given to the patient for self-use. The administration of **Morphia** by

suppository or hypodermically will give relief, but its action is too slow, while the drug is otherwise dangerous, and in many cases causes considerable sickness, with vomiting. A hot **Rectal Douche** is rapidly effective, but it is not always instantly available.

Patients who suffer from this malady demand a quick cure: they appreciate prophylactic treatment. The regulation of the bowels is necessary. Piles should be removed where they are chronic, and a box of vaporoles may safely be placed under the charge of the patient. After the entire subsidence of the pain a relapse is seldom to be expected for some considerable time: this applies alike to the spontaneous as to the induced disappearance of the crisis.

REFERENCE.—¹*Glasgow Med. Jour.* 1917, Sept., 129.

RECTUM, IDIOPATHIC DILATATION OF. *Robert Hutchison, M.D., F.R.C.P.*

Burd¹ describes cases of megarectum in which there was chronic diarrhœa. In one case, in a man of 48, previously published, the rectum filled the entire small pelvis, extending up to the diaphragm. Except for a tendency to constipation, there had been no trouble from this megarectum, which was a necropsy surprise, the nature of the tumour not being suspected. In a recent case the diagnosis was made in the clinic. The man of 45 had had for years six or seven soft stools daily. When he had to defecate twice in the night, he called it an attack of diarrhœa, but no medication modified it and there were no symptoms outside of the abnormally frequent soft stools. The rectum was much dilated, but not so much as in the first case, in which constipation dominated the clinical picture. In two other cases of megarectum with the diarrhœic tendency there was also megacolon, so that diarrhœa with megacolon should not be ascribed to colitis until megarectum has been excluded. In fact, the diarrhœa from the megarectum may mask the constipation from the megacolon. This may lead to serious mistakes in diagnosis, as in still another case he describes, in which various tedious courses of treatment had been futilely applied by different specialists to cure the assumed chronic colitis. This patient was a man of 60, member of a foreign embassy, not at all neuropathic, and in good general condition, but annoyed at having four or five passages of the bowels during the night, with two during the day. Röntgenoscopy showed the rectum abnormally dilated and long, and the colon also. In these cases of megarectum, medication to cure the diarrhœa had no effect, as it did not remove the cause, but great benefit followed **Lavage** of the rectum, rinsing it clean and thus putting an end to the incomplete spontaneous evacuation which was the cause of the frequent defecation. With megabladder, in the same way, there is only fragmented evacuation at a time, and hence the pollakiuria with megabladder is exactly analogous to the pollakicoprois with megarectum.

REFERENCE.—¹*Abstr. in Jour. Amer. Med. Assoc.* 1917, ii, 1568.

RECTUM AND ANUS, DISEASES OF. *W. I. de C. Wheeler, F.R.C.S.A.*

Bleeding from the Rectum.—In a paper on the diagnostic significance of bleeding from the rectum, Landsman¹ gives the following classifications of the various conditions in which bleeding from the rectum may be met:—

SURGICAL.

Local Conditions Not Acutely Surgical:—Hæmorrhoids (all forms except the external). Ulcerations: (a) Simple; (b) Specific—from tuberculosis, syphilis, gonorrhœa, various types of dysentery (amœbic, Shiga bacillus, Flexner-Lewis). Proctitis, proctocolitis, enterocolitis, simple and specific. Tumours: Benign (fibromata, lipomata, etc., various pedunculated tumours);

and Malignant (carcinoma, papilloma, multiple polyposis, sarcoma). Stricture (specific, non-specific). Proctidentia. Fissure. Cryptitis. Helminthiasis. Diverticula. Gastric or duodenal ulcer. Impaction. Chronic constipation (sometimes).

Local Conditions Acutely Surgical :—Foreign body. Volvulus. Invagination. Strangulated hernia. Portal or mesenteric thrombosis. Typhoid fever. Appendicitis. Rupture of aneurysm. Post-operative bleeding, following operations on rectum or colon. Abscess.

MEDICAL.

Mechanical :—Hepatic disease. Chronic nephritis. Cardiac decompensation. Arteriosclerosis and conditions accompanied by high blood-pressure.

Defective Blood States :—Hæmophilia. Purpura. Leukemia. Pernicious anemia. Scorbutus. Icterus.

Cancer of the Rectum and Pelvic Colon.—In a review of 491 cases of cancer of the rectum and pelvic colon, Lynch² gives a mortality of 16 per cent after radical excision. Early colostomy in inoperable cases is as vital to the patient as early operation in operable cases. Colostomy should not be postponed until the patient is moribund. The stress laid on age, pain, cachexia, loss of weight, and tumour as early signs is very misleading. In the series under review, 0.5 per cent were in children under nine years, 2.5 per cent were under nineteen years, and 7 per cent were under thirty. Many of the patients had had unmistakable symptoms of the disease for over a year; on the other hand, some of them had gained in weight. The signs and symptoms given in the text-books are often those of inoperable cancer. The diagnosis can only be made by digital examination, or by the proctoscope when the disease is out of reach of the finger. Malignancy ought to be carefully searched for in cases in which there are constipation, diarrhœa, hæmorrhoids, and loss of blood; 10 per cent of the cases had been operated on for hæmorrhoids within a few months of the discovery of the cancer. Often patients refer their symptoms to the stomach in early cases of carcinoma of the rectum, and for this and other reasons a rectal examination should be made as a routine in every case. Lynch states that many cases of carcinoma of the rectum are 'turned down' as inoperable without due consideration. On many occasions he has found it necessary to remove the uterus, resect the vagina, remove the prostate, and resect the urethra, the coils of intestines, and the bladder wall.

RESECTIONS IN CANCER PATIENTS.

	No. of Cases
Removal of a part or the whole of the prostate	.. 20
Resection of urethra, prostate, and seminal vesicles	.. 6
Resection of bladder wall	.. 4
Resection of a part or the whole of the vagina	.. 14
Hysterectomy complete	.. 9
Wertheim hysterectomy	.. 5
Removal of one or more coils of the intestine	.. 6

There is, of course, a high mortality in such operations, but the percentage of cures is sufficient justification. According to Lynch, the operation of choice is the combined operation without colostomy. He states that the under surface and the diaphragmatic surface of the liver are often involved early, and that only by abdominal exploration can this be determined. Whether the combined operation should be performed in one or two stages can only be decided at operation, and the surgeon must be guided by his own experience and judgement.

W. Harrison Cripps³ records the case of a patient who lived for more than

thirty years after an excision for rectal cancer. He says: "It is well known that freedom from recurrence after complete removal of cancer of the intestine is more likely than in many other situations. As it is not always easy to obtain the history of a case after many years, I am much indebted to Sir William Whitla, of Belfast, for giving me the completed record of a case thirty-one years after operation. Such a case is of much interest, and affords encouragement. In 1887 I operated in Belfast upon one of Sir William's patients, assisted by Mr. (now Sir Anthony) Bowlby, and Mr. Sinclair, of the Belfast Royal Hospital.

"The patient was a lady, age 53, who had had symptoms for six months. Examination under an anæsthetic showed that the disease commenced 3 in. above the anus, and extended upwards about 4 in. It completely surrounded the bowel, producing considerable stricture. The posterior wall was more deeply invaded than the anterior. The operation was difficult and prolonged, but eventually, after freely opening the peritoneum, a complete segment of the bowel 5 in. in length was removed, including half an inch of sound margin both above and below the growth. Microscopic examination showed a typical specimen of adenoid cancer. The patient, under the care of Sir William Whitla and Mr. Sinclair, made a good recovery.

"Five years later, owing to some contraction, an inguinal colotomy was performed (not under my advice). I saw the patient thirteen years after the operation. She was in excellent health, and there was no sign of recurrence. The colotomy opening gave hardly any trouble.

"Sir William Whitla has most kindly sent me, under date February, 1918, a letter as to the sequence of the case: 'I enclose a card informing you of the death of your old cancer case operated on in 1887. She has just died at the age of 84. Surely this is a record.'

Drueck,⁴ in a paper on the treatment of *cancer at the anus*, states that the mortality by the perineal operation is lower than by any other method, but it is not applicable where the cancer is in or above the rectum proper. Hæmorrhage is a serious handicap in perineal excision of the rectum, and there may be a considerable loss of blood in an already weakened patient. After a general discussion on the surgery of cancer of the rectum, he gives the following advice: An operation for cancer is an operation to save life. Cosmetic results are to be considered, but they are not to be weighed against recurrence and death a few years later. Never manipulate a cancer roughly, either before or during operation, or more often than is necessary to make a diagnosis. To do so is the easiest way to drive cells into lymph or blood current—hence metastasis. Do not rule out cancer because the patient is not old. About 10 per cent of cancers occur before thirty-five. To save your patients from cancer, save them from delay. Do not wait for pain and cachexia—the signs of impending death. Be always on the watch for early suspicious symptoms. Be prompt to follow them to a definite diagnosis. Be courageous enough to insist on immediate proper treatment.

There are some well-authenticated cases of *melanosarcoma of the rectum*, but the condition is extremely rare. Such tumours originate rather in the anorectal region than in the rectum itself, and are primary skin tumours. Histologically it is difficult to decide whether to regard the tumours as sarcomatose or carcinomatose. Many believe that they are essentially cutaneous epitheliomata. Churchman⁵ describes a case, and states that many of the chronic features are quite characteristic. They are usually situated low in the rectum, are often pedunculated, and may be either single or multiple. The clinical points in this paper may be summarized as follows: (1) The calibre of the rectum is usually little affected; (2) The mucosa is uninvaded, the

perirectal tissue invaded; (3) The inguinal glands are usually involved unilaterally; (4) There is no local involvement of the sacrum, bladder, etc.; (5) There is rapid multiple generalization. This last point should be emphasized, as it is an important feature of the disease. Metastasis will be found in 80 per cent of the cases, and a large group of patients will be spared an unnecessary intestinal resection if proper examination of the distal organs, such as the liver, is made.

Hæmorrhoids.—Terrell⁶ recommends the use of Quinine and Urea in the treatment of hæmorrhoids. It should not be used in inflamed, strangulated, or external piles, but is a specific in chronic internal hæmorrhoids which protrude and bleed. He bases his statement on the treatment of over 300 cases. The right strength of solution for the average case is approximately 5 per cent. The hæmorrhoid is injected each succeeding day as a rule, and afterwards the patient is asked to return once a week until a cure is effected. This takes about six weeks for the average case. Each hæmorrhoid is treated about once every two weeks. The piles on the right side are injected on one visit, and those on the left side at the next. Enough of the quinine and urea solution is injected to distend the pile slightly. In properly selected cases of hæmorrhoids treated with quinine and urea there is little or no pain during or following treatment.

The details of the technique of the injection treatment of hæmorrhoids are referred to in the MEDICAL ANNUAL, 1917, p. 449. Suitable needles and syringes to perform the injection through a speculum can be obtained from instrument makers. The operation can be readily done without dilating the sphincters or extruding the piles.

REFERENCES.—¹*Med. Rec.* 1918, Jan. 12; ²*Jour. Amer. Med. Assoc.* 1917, ii, 1775; ³*Brit. Med. Jour.* 1918, i, 230; ⁴*Med. Rec.* 1917, ii, 887; ⁵*Amer. Jour. Med. Sci.* 1918, May, 639; ⁶*Jour. Amer. Med. Assoc.* 1917, ii, 1590.

RE-EDUCATION OF DISABLED SOLDIERS AND SAILORS. (See ORTHOPÆDIC SURGERY.)

REFLEXES. (See also NERVES, PERIPHERAL; PARAPLEGIA.)

J. Ramsay Hunt, M.D.

The accumulation and recording of minute facts pertaining to petty variations in reflex action under various pathological conditions has, one might say, become one of the modern functions of the neurologist. Many of these phenomena have little more than a passing interest and vogue, while others—like the knee-jerk, the Babinski reflex, and the Argyll-Robertson pupil—mark a great advance in our knowledge of symptomatology. Perhaps in time some master mind may work out important generalizations from these multitudinous details; at present, however, we may simply record them.

Villaret and Faure-Beaulieu¹ have noted a flexion of the distal phalanx of the great toe on percussion of the tendo Achillis. This is not present normally, but occurs when there is a lesion or irritation in the distribution of the sciatic nerve. It is therefore to be grouped with those minor signs of *sciatic involvement* of which so many have been described in recent years. The reflex is elicited in the usual manner for the tendo Achilles jerk, and when present there is a slight flexion of the distal phalanx of the great toe. Boveri, who has also studied this phenomenon, regarded it as a perverted form of tendon reflex; the writers, on the other hand, interpret it as an evidence of increased idiomuscular contractility produced by percussion of the flexor longus hallucis, which lies on the internal surface of the tendo Achillis behind the internal malleolus. In favour of this view is the fact that the sign is more readily elicited when the inner side of the tendo Achillis is tapped. It is also more

active when there is evidence of increased idiomuscular irritability in the soleus and gastrocnemius. The importance of the phenomenon rests in the fact that it appears after slight irritative lesions of the sciatic nerve when other important signs—e.g., absence or diminution of the Achilles jerk—are not demonstrable. It is therefore an early sign of sciatic perturbation.

Felix Rose² emphasizes the prevalence of *sciatica* among troops at the front, the difficulties in diagnosis, and the possibilities of simulation and exaggeration. In order to distinguish genuine sciatic neuritis, he has found the *gluteal sign* of value. This is obtained by tapping along the lateral margin of the sacrum at the level of its second, third, and fourth segments. The percussion thus applied produces in the muscular bundles of the gluteus maximus which are attached to those sacral segments a fascicular contraction that is readily visible under the skin, and is of a very different form from the globular contraction which is characteristic of voluntary effort. This process of reflex testing should be carried out, for purposes of comparison, on both sides of the body of the patient in the prone position.

The exaggeration of the gluteal reflex which characterizes all cases of true *sciatica* is observable sometimes only on percussion of the affected side (homolateral reflex), while in other cases it follows in similar fashion on percussion of the healthy side (contralateral reflex). In every instance in which he has been successful in eliciting this physical sign, Valleix points and the presence of Lasègue's sign were also demonstrable. This mechanical muscular excitability subsides with the disappearance of the neuralgic symptoms; it has also vanished temporarily after an epidural injection of cocaine.

On the other hand, the author has never met with the sign in any subjects of contracture of the peri-articular muscles of the hip which had persisted as the result of prolonged maintenance of vicious attitudes—either by auto-suggestion or from fear of producing a possible recurrence of pain; nor in cases of muscular rheumatism which had become generalized over the whole lower limb, etc. It must here be added that the presence of this gluteal sign is not constant in all cases of sciatic neuralgia, but it is unquestionably met with in the majority. It is not, however, a pathognomonic sign, as it may occur in sacro-iliac disease and arthritic conditions of the hip. Nevertheless, it is of importance when found to co-exist with other classical symptoms of *sciatica*.

Bing³ has recently directed attention to a new reflex sign in *spastic paraplegia*. It is produced in the following way: With the patient on his back, the affected leg is put in the usual position for testing ankle-clonus—moderately flexed at the hip and knee. The foot is then brought into a position of moderate dorsiflexion, which induces slight tension of the tendo Achillis. The dorsum of the foot is then struck with the percussion hammer on a line passing between the malleoli. If the reflex is positive, there results a contraction of the gastrocnemius and a flexion of the foot, as in the ordinary ankle-jerk. In negative cases there is no movement, or a slight dorsiflexion of the foot. This reflex belongs to the type of inverted reflexes, in which percussion over a flexor surface induces an extensor response, and vice versa. Bing terms it the *paradoxical ankle-reflex*.

REFERENCE.—¹*Presse Méd.* 1917, 531; ²*Med. Press*, 1918, ii, 270; ³*Correspond. Blatt. f. Schweiz. Aerzte*, 1918, April 13 (abstr. *War Med., Surg. and Hyg.* 1918, 60).

RENAL FUNCTION TESTS. (See also KIDNEY, DISEASES OF; NEPHRITIS.)

John D. Comrie, M.D., F.R.C.P.

A group of 30 cases of renal disease have been studied by Stengel, Austin, and Jonas,¹ by certain of the kidney function tests, including the estimation of the plasma chlorides. The cases of acute nephritis showed a pronounced

impairment by all the renal-function tests. The cases of advanced chronic glomerulonephritis showed, in the most pronounced degree, rise of blood-pressure, diminution of the phenolsulphonephthalein excretion, rise of the blood-urea, and of the non-protein blood-nitrogen; but they were associated with a normal or even a lowered plasma-chloride level. Cases classed clinically as chronic parenchymatous nephritis which showed post-mortem changes in both tubules and glomeruli had less marked diminution of the phenolsulphonephthalein secretion, less marked elevation of the non-protein blood-nitrogen, and the plasma chlorides examined in the cases of this type were raised in amount. Fitz² describes a method of utilizing the urea index as a test for kidney function in situations where only elementary laboratory facilities are available, as, for example, in a military hospital on active service. The method which he adopted was a modification of that of McLean, 3 c.c. of blood being withdrawn from a vein in the arm, and a subsequent determination being made of the urea in blood and urine. The urea was determined by titration from the ammonia split off by the action of the soy-bean ferment. The apparatus consisted of a number of test-tubes containing the blood, the urine, and fiftieth-normal acid, connected by rubber tubing, and the ammonia was made to pass over by suction supplied by means of an ordinary chest-aspirating pump and bottle. He found that the test of renal function obtained in this way was closely parallel to the results of tests made by the phenolsulphonephthalein method, while in many instances the use of the former was the more convenient.

An exhaustive study of the chloride excretory function, in 51 cases of nephritis and allied conditions like mercuric-chloride poisoning and eclampsia, has been made by Wolferth.³ He finds an elevated plasma-chloride threshold, when circulatory disturbances can be excluded, is valuable evidence of the presence of nephritis. Further, that the chloride and urea functions may be quite independent of one another, and that in eclampsia, for example, the chloride excretory function is much more disturbed than that of the urea.

The value of the intravenous phloridzin test as a method of determining the functional power of the kidneys has been examined in several hundred cases of urinary-system disease by Krotoszyner and Stevens.⁴ Their procedure was to inject hypodermically 2 c.c. of a 0.5 per cent phloridzin solution, and thereafter to add to a small quantity of hot Fehling's solution the urine passed every few minutes, starting fifteen minutes after the injection. The whole test can be finished in an hour. In cases of normal renal permeability sugar should appear in about seven minutes, and in cases with renal capacity reduced to a pathological extent it should not be found earlier than fifteen minutes after the injection. The sugar secretion should be at its height during the succeeding fifteen minutes, and thereafter falls away rapidly, the sugar disappearing altogether after forty-five minutes. Persistently delayed appearance is characteristic of delayed renal function, but the total sugar excretion was found by these writers to be of no significance. As a test for comparative renal function they regard this method as being accurate and reliable.

An analysis of the comparative results of various functional kidney tests has been made by Thomas and Birdsall.⁵ They regard the indigo-carmin test as the most satisfactory, superior even to the phenolsulphonephthalein test. They do not consider Ambard's quotient of much utility so far as the differentiation of nephritis is concerned, while cryoscopy of the blood or urine is valueless, and the estimation of the creatinin or urea-nitrogen very variable in result. The estimation of the total non-proteid nitrogen or of the urea-nitrogen of the blood they place on a par with the phenolsulphonephthalein test.

REFERENCES.—¹*Arch. Internat. Med.* 1918, March 21 (abstr. *Jour. Amer. Med. Assoc.* 1918, i, 1033); ²*Jour. Amer. Med. Assoc.* 1918, i, 1755; ³*Amer. Jour. Med. Sci.* 1917, ii, 84; ⁴*Jour. Amer. Med. Assoc.* 1917, ii, 1865; ⁵*Ibid.* 1747.

RETINA, GLIOMA OF.

R. Foster Moore, F.R.C.S.

Hereditary Glioma.—A. Hill Griffith¹ records two instances which are an interesting addition to the literature of glioma of the retina. He mentions a case reported by Berrisford in the Moorfields Reports, where a man had one eye removed for glioma, and his daughter had four children, all with glioma, three of them being bilateral, whilst she herself was free of the disease. The author's cases are composed of two families:—

1. *The Smith Family.*—This is a family which has been under Hill Griffith's observation for sixteen years. The mother of the family had had her right eye removed at the age of nine months, apparently for glioma. There have been six children, of whom four have had double glioma of the retina. Of the two escaping, one is now twelve years old, and one is a baby of ten weeks. The mother states that the two children who have not developed the disease were the only ones that were bottle-fed, and she ascribes their immunity to this fact.

2. *The Jones Family.*—The mother of this family had her right eye removed for glioma at the age of 2½ years. There were four children, of whom the first was still-born. Of the three remaining, one child has had both eyes removed for glioma; it is now more than three years since the second eye was removed, and the child remains well. The other two children have each had one eye removed for glioma, and they are both well ten years later. All these three were breast-fed.

The author states that there are six cases of hereditary glioma of the retina on record without the present ones. He points out that these hereditary cases seem to show an abnormal tendency to affect several members of the family and to implicate both eyes.

Glioma Retinae and Intra-ocular Radiotherapy.—Axenfeld, Küpferle and Wiedersheim,² describe a case in which the right eye of an eight-months' infant was removed for glioma, the left eye being already affected by the same disease. The second eye was treated by X rays by Küpferle, the tumour was reduced in size, and sight was apparently improved. Axenfeld advises that the second eye should always be carefully examined, under an anæsthetic if necessary, and in agreement with Pusey recommends that after an enucleation for glioma x rays should always be used to the orbit.

REFERENCES.—¹*Brit. Jour. Ophthalm.* 1917, Sept., 529; ²*Klin. Monatsbl. f. Augenheilk.* Bd. liv, 61 (abstr. *Brit. Jour. Ophthalm.* 1918, Feb., 105).

RHEUMATIC HEART DISEASE.

Carey Coombs, M.D., F.R.C.P.

Poynton,¹ in a comprehensive survey of this subject from its earlier, childhood aspect, shows how important a problem it is that confronts us. Chronic valvular disease, one of the chief causes of disability and early death among our adult population, is largely due to rheumatic infection of the heart in childhood. He reviews the evidence in favour of the streptococcal nature of this infection, and very properly claims that the pioneer work done by himself with Paine has established this bacteriological fact. He speaks of the tonsils as the usual portal of entry. In this connection it is interesting to find so great an authority as Nobécourt² insisting on the essential identity of scarlatinal with rheumatic carditis; the heart becomes inflamed in scarlatina because that infection lets the rheumatic streptococcus into the body. Poynton thinks the nasal mucosa and its aural annexes may also act as portals of entry. Rheumatism, as he points out, is a polymorphic infection, and especially in childhood. To understand it as a cause of heart disease one must visualize an infection which may attack heart, brain, joints, or skin, either singly or in any combination. After a brief summary of the chief

characteristics of the pathological changes, he passes on to show that as a first manifestation of this multiform disease, the cardiac lesions rank almost equally with chorea and arthritis. These lesions he describes under the headings of acute dilatation, fatal first attacks of carditis, rheumatic pericarditis, rheumatic endocarditis, and myocarditic or neuromuscular cardiac affections. As he points out, these are merely diverse aspects of one and the same disease—rheumatic carditis. The fundamental facts regarding this disease may thus be summarized: The infection is one which attacks all parts of the heart, in varying proportions. In all cases the myocardium is injured, the mitral valve also in practically all cases. In severe cases the pericardium is demonstrably injured, and in a large proportion the aortic valves. The invasion may be so severe as to kill the child outright. Much more often, however, the first attack is survived, but the heart is left permanently crippled. During childhood and adolescence fresh attacks occur, each of which adds a little to the permanent lesions. Any one of these attacks may be fatal, but in a large percentage they are mild, often undetected, and adult life is reached. Even so, however, the heart is irreparably injured. The cases we are accustomed to label 'mitral stenosis' are in reality cases of post-rheumatic disease of the heart; and so are a considerable proportion of cases of 'aortic regurgitation.' Moreover, as the war-time researches of Lewis and others have shown, the heart that has apparently recovered from early rheumatic attacks without any abiding lesion is nevertheless the seat of a latent weakness, which becomes manifest under the stress of military service (*see* HEART, SOLDIER'S).

TREATMENT.—This disease constitutes a serious national problem, almost as great as that of tuberculosis; and yet we are doing next to nothing for it. Treatment is unsatisfactory. Poynton is in favour of enucleation of the tonsils after these have ceased to be actively inflamed. He thinks diet restriction not only useless but harmful. His other points call for verbatim quotation:—

"1. The salicyl compounds . . . are of value in relieving rheumatic pains, but if faith is pinned upon their specific value, we are logically driven in severe cases to large doses, and these are dangerous, particularly to fragile, delicate children. No specific result will follow their use, though death may occur from drug poisoning.

"2. Patience and dogged perseverance with excellent nursing are still the most valuable aids to recovery, and though rest will not prevent an acute attack, its value is attested to by all.

"3. Pericarditis very rarely indeed will need operative interference.

"4. Continued disturbance of a child with severe heart disease by external applications and drugs does more harm than good. We do not know how to cure the disease, and are therefore not justified in preventing Nature from having a share in the attempt.

"5. Vomiting, digestive disturbances, and sleeplessness require prompt and early measures for their relief.

"6. The leading principle during convalescence is not passive rest but cautious progress, and the ideal is to make the interval between absolute rest and a return to everyday life an inclined plane.

"7. No forward movement is indicated while the area of cardiac dullness is still diminishing and the impulse improving in strength. A gain in weight and colour may be of even more value than slight changes in the physical signs. The aim is to obtain a steady level in the cardiac condition. This level must be dependent upon the condition of the heart before the particular attack, and, if the heart is already damaged, this must necessarily be but of relative efficiency. When we get a clear idea of this cardiac level, then we can com-

mence the cautious progress forward, testing each step as we go by the general condition of the child, the temperature, the pulse, and cardiac physical signs.

" 8. Small doses of digitalis are often helpful during the early forward steps in convalescence, but a rash or sudden over-exertion may delay recovery for weeks, and is the great danger in this stage.

" 9. The nervous element, so marked in aortic disease and myocardial affections, requires cautious handling and sympathetic attention.

" 10. When care has been exercised we find that the great cause for a failure in the cardiac power in childhood is a recurrence of rheumatism."

The hope of the future lies in prevention. Again to quote Poynton:—

" 1. When time and circumstances permit, this should be a national effort.

" 2. The topographical incidence of the disease in the country should be reconsidered from the standpoint of an infective process.

" 3. To live in well-built houses should be a duty we owe to children.

" 4. Special convalescent homes in touch with the large hospitals should be established.

" 5. The education of the public, and in particular of those connected with educational institutions, in the broad outlines of the disease should be perseveringly undertaken.

" 6. The supervision of children during the school age has already been undertaken, and this supervision should be extended to the proper choice of employments for those with hearts damaged by the disease.

" 7. The scientific study of the disease should be conducted in an institution or institutions in order to ensure an *unbroken* record of research on the broadest lines. Individual effort would not be interfered with, but the unavoidable break in continuity associated with individual research must in my opinion be rendered impossible in the future by a permanent centre for investigation of rheumatic diseases."

REFERENCES.—¹*Brit. Med. Jour.* 1918, i, 249 and 417; and ii, 1 and 305; ²*Presse Méd.* 1918, 429.

RHINITIS. (See NOSE.)

RICKETS.

Frederick Langmead, M.D., F.R.C.P.

L. Findlay¹ computes that at least 50 per cent of the children of industrial populations are affected by rickets.

ETIOLOGY.—During the years 1912–14 he conducted a statistical study of the dietetic and home conditions of 500 rachitic children, and came to the conclusion that the chief factors in the causation of the disease were overcrowding of the home and insufficient exercise in the open air. During the last three years, together with Prof. Noel Paton and Miss Ferguson, he has inquired more closely into the conditions—dietetic, hygienic, etc.—of actively rachitic and non-rachitic children belonging to the same social class. The factors which seemed to be of paramount importance were, in order of significance: (1) Improper housing; (2) Absence of facilities for open-air life; (3) Imperfect parental care. Poverty *per se* did not appear to be of any moment. The amount spent on food was proportionate to the size of the family, but that spent on rent was greater in the non-rachitic than in the rachitic family. The frequency of rickets was directly proportional to the air space available for each person in the home. In the case of the markedly rachitic children, 3.93 persons inhabited each apartment, whereas 3.0 persons per apartment was the average for the non-rachitic. The cubic feet of air space per person was as follows: For the markedly rachitic families 422, for the mildly rachitic 483, and for the non-rachitic 625. Only about

50 per cent of the houses inhabited by rachitic families could be described as clean and tidy, whereas 85 per cent of those of the healthy children were clean, well ventilated, and well furnished. About 30 per cent of the homes of the rachitic children were much neglected, dirty, and bare, with insanitary bed-clothes, and stuffy atmosphere.

Of the rachitic children, only 30 per cent were sufficiently exercised in the open air; whereas of the healthy children, 86.5 per cent were properly exercised. The seasonal incidence also bears upon the question, for active rickets is met with more frequently during the spring after the inclement months of the year, when confinement indoors is most likely to occur.

Gismondi² believes that any milk allowed at night after the first year of life favours the development of rickets.

SIGNS.—Quant³ describes a T-shaped depression in the occipital bone which he found in 60 per cent of the cases of rickets examined. It was found in mild and severe cases alike, and may be the first sign to develop and the last to disappear. Above and on both sides of the groove the skull has the normal curve, but looks as if it bulged abnormally, the anomaly having been given the name *tribounocephaly* from its formation.

Tardy Rickets.—A case is recorded by B. Ricklin¹ of rickets starting at the age of 13. The patient was of a healthy family, and previously had been well, living in good circumstances in the country. He became irritable, lost flesh, and developed genu valgum. The calcium and phosphoric acid metabolism over six periods, two before, two during, and two after systematic courses of cod-liver oil and calcium phosphate, showed remarkable improvement under this treatment, and the boy ultimately attained normal growth and symmetry, and lost the evidences of rickets. At first **Phosphorus with Cod-liver Oil** was given with benefit, but still better results were obtained when it was replaced by the **Insoluble Tribasic Calcium Phosphate** 10 grms. to cod-liver oil 100 c.c.; 5 c.c. being given thrice daily.

TREATMENT.—Gismondi² considers that a little soft mashed vegetable helps to ward off the malady, and orders it at the seventh or eighth month. The yolk of eggs, if given before the child is two years old, and especially before it is a year old, has seemed to do more harm than good. For the treatment he prefers to give **Cod-liver Oil** in the form of a 50 per cent emulsion; to each 100 grms. of this emulsion he adds 0.01 gm. **Phosphorus**. He prescribes one or two teaspoonfuls of the mixture a day, to be taken immediately before meals. He combines the treatment with the administration of **Calcium Acetate** in doses amounting daily to a total of 0.5 gm. In his opinion a much larger proportion of the acetate is retained—up to 20, 30, or even 60 per cent—than of the phosphate or citrate. The same treatment has a curative effect in *spasmophilia*. The results of the treatment have been very satisfactory.

REFERENCES.—¹*Glasgow Med. Jour.* 1918, May, 268; ²*Rivista di Clin. Pediatr.* 1918, No. 3, p. 128 (abst. *Jour. Amer. Med. Assoc.* 1918, 1405; ³*Corresp.-Blatt. f. Schweizer Aerzte*, 1917, Nov. 24, 1586 (abst. *Jour. Amer. Med. Assoc.* 1918, i, 200; ⁴*Nederlandsch. Tijdschrift voor Geneeskunde*, Aug. 4, 371 (abst. *Jour. Amer. Med. Assoc.* 1917, ii, 1480).

RINGWORM.

E. Graham Little, M.D., F.R.C.P.

Priestley¹ gives an interesting *résumé* of his ten years' experience of school inspection in the case of ringworm. As might be expected, it is a disease of young school life, the highest incidence being between five and six years. It was slightly less frequent in girls than in boys. The average duration of the disease was nine months, and the author is convinced that spontaneous cure takes place quite frequently, and the disease is of low infectivity, epidemics being rare. He would allow affected children to attend school if simple pre-

cautions are taken. It is not surprising then that the author deprecates routine application of x rays, which he would reserve for "the 5 to 10 per cent of excessively protracted cases." These views are supported by an investigation of 778 cases, most of whom attended school all the time and had been domestically treated, all x -rayed cases being excluded.

TABLE SHOWING DURATION FROM DATE OF DISCOVERY OF 778 CASUALLY TREATED CASES OF SCALP RINGWORM. (MALES 461, FEMALES 317).

Duration after discovery	No. of cases which had terminated	Percentage of cases which had terminated
Over within three months ..	163	20.9
„ six months ..	375	48.2
„ nine months ..	517	66.4
„ twelve months ..	611	78.5
„ fifteen months ..	665	85.4
„ eighteen months ..	699	89.8
„ twenty-one months ..	721	92.6
„ twenty-four months	741	95.2
Over during third year ..	27	4.87
„ fourth year ..	7	
„ fifth year ..	3	

The duration of treatment seemed to have little relation to the vigour or completeness of treatment; this was of the most varied nature, and indeed doubtless of very little effect, so that the inference that cure is spontaneous is probably inevitable. The precautions insisted on by the school authorities included the application daily of carbolized oil to prevent hairs flying about, and the wearing of washable cotton caps, which were washed and boiled twice a week under school supervision.

Weiss² reports a case of *eczematoid ringworm* of unusual extent and distribution in an adult man, who showed the disease in the groin, the toes, forearms, thighs, and knees, and on the scalp, a region which is seldom affected. A ring about six inches in diameter was seen on the back of the head, without any loss of hair. Fungus was grown from this area, and from the other regions affected, and showed, characteristic cultures of epidermophyton, but it is not stated if the hair itself was involved. Salicylic acid 7 per cent, and benzoic acid ointment 14 per cent, recommended by Whitfield, did not have much effect, but the disease was speedily cured by the application of 3 per cent **Pyrogallie Acid** ointment for the hairy parts, and 3 per cent **Chrysarobin** ointment to the glabrous skin.

[This case cannot be regarded as an instance of infection of the hair, which probably does not occur with this organism. I have reported an even more extensive distribution of this disease, also in an adult, in whom also the scalp was affected but the hair itself remained free.—E. G. L.]

Buschke³ makes the observation that trichophytosis, which was relatively rare in Germany before the war (2 per cent of all skin diseases, 23 per cent for the second half of 1917), has increased owing to poverty, lack of soap, and defective housing accommodation, as well as to the spread of the disease by returning soldiers, mostly from the Western front. Bruhns,⁴ in 73 cases culturally examined, found 34 *Trichophyton gypsum*, 37 *T. cerebiforme*, 12 *Epidermophyton inguinale*.

Kister and Delbanco,⁵ of Hamburg, obtained growths of trichophyton fungus

from 131 bank-notes, and recommend the withdrawal of dirty paper money from circulation. P. Unna, jun.,⁶ in charge of a large skin hospital dealing with troops from the Western front, recommends the following treatment of ringworm of the beard: Compresses of **Resorcin** solution 2 to 3 per cent, or, when more superficial, application of **Tincture of Iodine** 2 to 10 per cent, twice to four times daily, combined with complete **Epilation**. Abscesses were dealt with by **Paquelin's Caustery**. Treatment was required for two weeks to three months, and is said to compare favourably with the *x* rays. Arning⁷ recommends the application of pure **Carbolic Acid** to the affected patches of the beard, after thoroughly drying the skin. The application may have to be repeated. Alexander⁸ urges the use of **Hot Poultices** combined with **Epilation** in all deep-seated trichophytosis of the beard.

Paul⁹ cites an interesting epidemic of ringworm occurring in *workers handling wheat*, the origin of which was traced to an infection by mice, many of which were found to be diseased. The eruptions occurred mostly on exposed parts, especially the forearms and the face. The earliest symptom was an exaggeration of the papillæ of the skin, like goose-skin without any redness; erythema and intense itching, vesicles and pustules developing later. In the more advanced patches an eczematoid appearance was common. A fungus not hitherto identified was isolated from scales which grew on proof media, a knob-like button surrounded by a purple-lake growth. Hairs showed an ecto-endothrix ringworm. The author proposes to name the fungus *Trichophyton rodens* from its presence in mice.

Priestley¹⁰ claims to have isolated two new types of ringworm fungus in Townsville, one growing a yellow or white culture with red discoloration of glucose-agar media; the second was probably an epidermophyton.

Eczematoid Ringworm of the Toes.—Sabouraud¹¹ gives some excellent practical suggestions regarding the diagnosis and treatment of this disorder, which assumes an especial importance in war time. The seat of the trouble is most often in the cleft of the fourth and fifth toes, though all the digits may be more or less affected. The patients usually complain of an uncomfortable local heat and itching, and inspection shows vesicles, fissures, and a sodden and thickened skin. The treatment recommended is as follows: The affected site should be freely **Curetted** with a sharp spoon to remove all the sodden horny layer, then painted with a swab wet with 20 per cent **Iodine**, which is allowed to dry, and the parts are then dressed with a **Zinc Cream** of which the formula is thus given: Zinc oxide 6 parts, vaseline 20 parts, lanolin and distilled water each 5 parts. This procedure should be repeated daily for eight days, after which an ointment of 1 per cent **Chrysarobin** may be applied with advantage for some days longer. Even with the utmost care recurrences are common, and may be usually ascribed to an insufficient curetting in the first instance, and the author lays stress on the avoidance of stronger solutions of iodine than that named.

REFERENCES.—¹*Brit. Jour. Child. Dis.* 1917, Dec., 241; ²*Jour. Amer. Med. Assoc.* 1917, ii, 1059; ³*Zeits. f. ärzt. Fortbild.* Jena, 1918, 15, 307; ⁴*Dermat. Woch.* 1918, 66, 225; ⁵*Deut. med. Woch.* 44, 681; ⁶*Dermat. Woch.* 1918, 66, 335; ⁷*Deut. med. Woch.* 1918, 44, 681; ⁸*Med. Klin.* 1918, 14, 639 (Nos. 3 to 8 quoted from the *Med. Supp. Rev. Foreign Press*, 1918, Oct. 1); ⁹*Med. Jour. Austral.* 1915, Dec., 496; ¹⁰*Ibid.* 1917, Dec. 1, 471; ¹¹*Presse Méd.* 1918, May 30, 276.

RUBELLÁ.

J. D. Rolleston, M.D.

J. C. Geiger¹ records an epidemic of German measles in a town adjacent to an army cantonment. The average incubation period in 173 cases was 17 days, the shortest time being 11, and the longest 21 days. Recurrent attacks occurred in 15 cases; in 5 there were three distinct attacks. The

epidemic was apparently unusually severe owing to the number and character of the complications. In 36 cases acute arthritis occurred, in 4 of which haemolytic streptococci were isolated from the much enlarged knee-joints, one of which subsequently developed a deformity fixation. In two cases acute nephritis was noted. Endocarditis occurred in one case, and otitis media in eight cases. Pneumonia was not observed.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1918, i, 1818.

SARCOMA OF THE TONSIL. (See TONSIL.)

SCABIES.

E. Graham Little, M.D., F.R.C.P.

MacCormac and Small¹ describe scabies as complicated by active service conditions, laying stress particularly on the relative infrequency of finding the characteristic 'burrow,' which was present in only 13 per cent of the cases, and on the importance of secondary impetiginization, which added greatly to the difficulty of cure, and kept patients invalided on an average for 31.67 days. They urge *preventive measures*, of which the most important are frequent inspection of the men, and early isolation and treatment of the infected cases, and very especially the disinfection of bedding, of which perhaps blankets are the most frequent means of spreading infection. For the treatment the authors condemn without reserve the vapour sulphur-bath method recently re-introduced. The routine they recommend as most effective is thus described:

Before entering the bath, he rubs himself thoroughly all over with soap, massaging it into the skin, and paying particular attention to the fingers, toes, wrists, penis, and axillæ. This should be continued for at least ten minutes. He then enters the bath, which should be both long enough and contain a sufficiency of water to permit of immersion to the neck. After first steeping for fifteen minutes, he scrubs himself vigorously all over with the nail-brush for the purpose of opening burrows and vesicles. If the eruption is particularly severe or painful, this part of the procedure may be correspondingly modified. After the bath a final inspection should be made, when any unruptured vesicles can be opened with a surgical needle. After removing the soap and drying, a liberal quantity of **Sulphur Ointment** (B.P.) is provided, with which the patient rubs himself vigorously all over, from the neck downwards, special attention being paid to the affected parts and to the fingers, wrists, genitals, axillæ, toes, and ankles. The ointment must be liberally applied twice a day for three days and thoroughly rubbed in, so that when finished he should be literally 'soaking' in it. Finally, on the fourth day, but not before, a second bath is given, and all the patient's clothing and bedding sterilized to prevent reinfection. Even such articles as wrist-straps, strings of identity discs, gloves, etc., should be included.

The vast majority of cases, unless there be secondary complications, will be found cured after three days of such treatment. Should any doubt exist, 2 per cent **Beta-Naphthol** in vaseline may be used daily for four more days. Only under exceptional circumstances should sulphur ointment be applied for more than three days, since its continued use is liable to cause severe dermatitis. Indeed, in susceptible persons a mild degree may be occasioned by the three-day treatment. This is usually easily cured by zinc ointment or Lassar's paste. At the completion of treatment the existence of some degree of itching is not uncommon; this is due to the remedy, and does not indicate failure of cure; it will rapidly pass off, and should be disregarded. Some days also will probably elapse before all the lesions of scabies have disappeared, although the man is no longer infective. A certain degree of pigmentation may persist indefinitely.

Allan² gives the warning that the application of balsam of Peru, and of storax, both of which have been frequently recommended in the treatment of juvenile scabies and in persons who do not tolerate sulphur, is not free from risk, as he has found albuminuria in a large percentage of cases of children treated in this way.

The treatment recommended by Oppenheim³ is as follows: (1) The naked body is rubbed with **Soft Soap** for fifteen minutes, the favourite sites for the burrows, namely, between the fingers, the wrists, armpits, thighs, genitals, and nates, receiving special attention. (2) The patient is then put into a warm bath (temperature 86°), and again scrubbed with soft soap, this time for half an hour. (3) After leaving the bath the patient is anointed with **Hardy's Ointment**, consisting of sublimed sulphur 2 dr., carbonate of potassium 1 dr., and 1½ oz. of vaseline, and left for two hours with the ointment on, and wrapped in a towel, with gloves on the hands and socks on the feet. (4) The patient is again given a bath, and the ointment rapidly removed with soap; he is dried, and smeared with **Zinc Paste** (zinc oxide and talc in equal parts, with double the quantity of vaseline). The treatment, which has occupied three hours, is now completed. Moderate itching lasts for a few days, and then passes off. After treating more than 1200 cases on these lines, Oppenheim very seldom employs other methods, even in private practice.

Rheins⁴ advises in *impetiginized and ulcerative complications* of scabies the application twice daily for two days, or longer if necessary, of an ointment composed of **Turpentine, 1, Red Oxide of Mercury 50.**

Barduzzi⁵ recommends the following treatment for rapidly dealing with large numbers of cases of scabies. The patient is placed in a bath at 100°, and rubbed all over with soft soap for about half an hour, from the neck to the feet, special attention being given to the sites of predilection for the acarus. He is then taken out of the bath and made to rest on a bed, where he is rubbed with an ointment consisting of 2½ lb. of **Helmerich's Ointment** (sulphur 2 parts, bicarbonate of potash 1 part, lard 8 parts), and 7 oz. of turpentine for fifteen minutes, and is left wrapped up in a blanket for five to six hours, during which time he is given a bowl of broth, hot milk, or wine. He is then placed for twenty to thirty minutes in a hot bath in which 5 to 8 oz. of bicarbonate of potash or soda have been dissolved. Lastly, after he has been well dried, the skin is dusted with the following powder: zinc oxide 1 oz., starch 2 oz., talc 2 oz., menthol 30 gr. The treatment is now complete, and the patient is allowed to put on his clothes, which have been disinfected in the meantime. Relapses do not amount to more than 2 per cent under this method.

Dubreuilh⁶ gives the following formula and directions. He uses an ointment consisting of a mixture of 200 grms. lard, with 20 grms. each of **Black Soap, Sulphur Precipitate, and Balsam of Peru**, and 10 grms **Beta-Naphthol**. The whole of this is rubbed vigorously with the hands into the skin, sparing only the face and scalp, which are never affected, and the middle of the back, which is seldom involved. The salve should be rubbed in energetically for fifteen or twenty minutes at night, and the patient should sleep in gloves and socks. He advises repeating the applications the third and fifth nights, changing the linen the first and last days. The important part of treatment is to rub the salve all over, not merely where the lesions are apparent, beginning with the fingers and toes separately, and paying special attention to the genitals, buttocks, and breast. Ordinary laundering disinfects the linen. Another important feature of treatment of scabies is that the suspects in the environment must also be treated at the same time, or reinfection is certain. The cleansing bath should not be taken until morning when the salve is applied at night.

Milian⁷ uses the following formula, which he has found especially useful in military practice :—

R	Vaselin.		Aq.	260 grms.
	Adipis Lanæ	āā 250 grms.	Zinc. Oxid.	5 grms.
	Potass. Polysulph.	50 grms.	Paraffin. Liq.	200 grms.

This is applied for two days, and washed off with soap and water on the third day.

DIAGNOSIS.—Sabouraud⁸ has some excellent hints for the non-specialist. He gives these useful aphorisms : (1) Itch is a venereal disease. By this is meant that sexual intercourse is by far the commonest means of infection, but contact other than venereal is of course often the cause. (2) Contagion may clear up a doubtful diagnosis. "A communicable disease which is not pediculosis is scabies." The lesions of pediculosis are larger, the scratching more furious, the distribution on the shoulders characteristic. (3) Scabies has a very characteristic distribution : feet in babies, penis in man, breasts in women ; hands, wrists, axillæ, and gluteal folds in both sexes. It always spares the face. The interdigital clefts are by no means so frequently the seat of infection as text-books state.

REFERENCES.—¹*Brit. Med. Jour.* 1918, ii, 384 ; ²*Prescriber*, 1917, Nov., 209 ; ³*Wien. med. Woch.* 1918, 68, 637 (abstr. *Med. Supp. Rev. of Foreign Press*, 1918, Sept. 1, 300) ; ⁴*Med. Klin.* 1918, 14, 448 (abstr. *Med. Supp.* 1918, Sept. 1, 300) ; ⁵*Riforma Med.* 1918, 37, 575 (abstr. *Med. Supp.* 1918, Oct. 1, 350) ; ⁶*Jour. Amer. Med. Assoc.* 1918, ii, 858 ; ⁷*Ibid.* 605 ; ⁸*Med. Press and Circ.* 1918, Aug. 14, 114.

SCARLET FEVER.

J. D. Rolleston, M.D.

TREATMENT by the intramuscular injection of the **Blood of Convalescent Patients**, an instance of which was given in last year's MEDICAL ANNUAL, p. 468, was employed by A. Zingher¹ in fourteen cases of malignant scarlatina, with gratifying results. The blood obtained from the donor may either be injected directly, or it may be first citrated by adding 1 oz. of blood to 1 c.c. of a 10 per cent solution of sodium citrate, making the final solution of the citrate 0.33 per cent. The following muscles are chosen, and a syringe of blood is injected into each : gluteal muscles, outer aspects of thigh, calves, and triceps muscles. In a young child 4 oz. of blood can easily be injected, and 8 oz. into an older child or adult. At the end of twenty-four hours the muscles will be found to have regained their former size and consistence. The effect of convalescent blood or serum in suitable cases of scarlet fever may be summarized as follows : (1) The fall of temperature begins within two to four hours after the injection, and reaches its lowest point in nine to fourteen hours ; (2) The pulse becomes stronger, steadier, and slower ; (3) The cardiac symptoms and cyanosis improve ; (4) Respiration becomes more normal ; (5) The general condition improves perceptibly ; (6) The rash fades rapidly ; (7) The secondary septic complications are not affected. The treatment should be commenced early, before the patient is overcome by toxæmia.

The same treatment was successfully adopted by Weaver² in his severest cases of scarlet fever. The blood was taken from the twentieth to the twenty-eighth day of disease, only such convalescents being chosen as were free from tuberculosis, who had not had septic attacks, and who gave a negative Wassermann reaction. Intramuscular injections ranging from 25 to 90 c.c. were given into the outer side of the thigh, 60 c.c. being the usual dose. No local or general disturbances followed the injections. Kling and Widfelt³ also report satisfactory results from the employment of convalescent serum, which they used in 237 cases, in 202 intravenously and in 35 intramuscularly. The mortality among the severe cases was 70.3 per cent for those not treated

with serum, and 17·7 per cent in the serum-treated cases. The earlier the treatment was given, the better were the results obtained. The serum did not have any prophylactic or curative effect upon complications.

Owing to the many resemblances which scarlet fever has to *acute rheumatism*, Ramond and Schultz advocate treatment by *Salicylates* from the onset until the temperature has become normal, and again from the fifteenth to the twentieth day, as it is then that complications are liable to occur. At the onset an average dose should be 90 gr. a day, and on the fifteenth day a similar dose may be given, which should be reduced 15 gr. daily till the twentieth day. In late nephritis the dose should not exceed 30 gr. daily, as the drug is poorly excreted and may become dangerous.

REFERENCES.—¹*N. Y. State Jour. Med.* (abstr. *Brit. Jour. Child. Dis.* 1917, 221); ²*Jour. Inf. Dis.* (abstr. *Jour. Amer. Med. Assoc.* 1918, i, 958); ³*Hygiea* (abstr. *Brit. Med. Jour.* 1918, ii, 93); ⁴*Jour. de Méd. de Paris* (abstr. *Brit. Jour. Child. Dis.* 1917, 221).

SCARS, UNSTABLE.

W. I. de C. Wheeler, F.R.C.S.I.

Staige Davis recommends relaxation incisions in dealing with extensive unstable scars. Some scars are like wet tissue-paper, and the slightest injury will start an ulcer that will require weeks to heal. It is preferable before treatment that the area be entirely healed, or at least that the granulations have been brought into a healthy condition. This can be done by applying a wet dressing of physiological *Sodium Chloride* and painting with tincture of *Iodine*, and the surrounding scar is cleaned with ether and alcohol. Relaxation incisions are made through the surrounding healthy tissues to allow the scar to contract, and these gaping incisions are subsequently skin-grafted. This method is probably useful in many cases; but in the limbs it should be found possible quite often to curette away or excise an unstable scar, and to cover the area with pedunculated skin flaps taken from the immediate neighbourhood.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1917, ii, 2085.

SCIATICA. (See NEURITIS AND NEURALGIA; REFLEXES.)

SCLERODERMIA.

E. Graham Little, M.D., F.R.C.P.

Robinson¹ contributes an extremely carefully observed and fully reported case of scleroderma which showed several characteristics of the affection described under the name of *acrodermatitis chronica atrophicans*, the nature of which, and its relation to scleroderma, is controversial. The present case clearly indicates that the separation of this group from scleroderma is premature, for it followed in its development a course allowing of its classification with either. Histological investigation was equally confusing, some parts of the skin showing cellular infiltration, others not. Three types of skin change were noted: (1) Areas of white, opaque, or waxy, swollen appearance. There are two such areas, about the size of a dollar, one on each side of the umbilicus, and one about twice that size over each gluteal muscle. One above the left patella and on the ulnar aspect of the left arm. (2) Surrounding these areas the skin is smooth, oedematous-looking, and of a translucent, violaceous tinge. In places the veins are very easily seen through this. From the breasts down to a point midway between the knee and thigh there is a gradual transition from the smooth, violaceous appearance to the third stage. (3) Here the skin is brown, wrinkled, resembling crumpled cigarette paper, quite thin, and over the hips adherent. In places it is scaly. There are patches of this type of skin on the dorsum of the left ankle, both sides of the knees, both axillae, and extensor surfaces of both elbows. Over the joints the skin is not as wrinkled, but it is hard and tense, and cannot be picked up between the fingers.

There is a small, pea-sized nodule in the left Scarpa triangle. It is brown and slightly elevated, and is in the integument.

The patient's temperature was constantly raised (101°), with no adequate explanation for it. Some improvement resulted from the administration of **Thyroid Extract**, gr. 5 ter die, but this had to be stopped owing to the development of palpitation.

Coley,² influenced by the excellent paper by Robinson just abstracted, tried the effect of giving thyroid extract, 6 gr. ter die, in a case of very chronic scleroderma of the feet and hands, the palmar surfaces of which were completely covered with enormously thickened patches of callus-like tissue which rendered the patient unable to walk or use his hands. Remarkable improvement followed within a month of treatment, and a condition pronounced 'almost normal' was noted within two months.

REFERENCES.—¹*Amer. Jour. Med. Sci.* 1917, ii, 657; ²*Ann. Surg.* 1918, May, 632.

SCURVY, INFANTILE.

Frederick Langmead, M.D., F.R.C.P.

Useful experimental work has been done by Harriette Chick, E. M. Hume, and R. F. Skelton,¹ in estimating the antiscorbutic value of milk in infant feeding. They find that cow's milk is endowed with no great excess of anti-scurvy vitamine, and that it is necessary to beware of introducing in its preparation methods which may lead to a diminution in this valuable constituent. Such processes include heating (pasteurization or boiling) and drying. The experiments showed an almost complete loss of antiscorbutic properties to have taken place in both dried and strongly-heated milk (120° C. for one hour). In practice, where milk is heated to a less degree—e.g., pasteurized or boiled—loss in its vitamine value is also to be apprehended. When any of these methods are employed it is therefore necessary that the diet should be reinforced with an extra supply of antiscorbutic material from outside sources. Fresh orange-juice proved to have great antiscorbutic value, but raw meat-juice was inferior.

Those who think that the addition of antiscorbutics is unnecessary are asked to reconsider their opinion in view of the following observations. Scurvy in the human subject is a disease of very slow development, in which symptoms are noticed only after several months of imperfect nutrition, and it is possible that scurvy of a mild latent type is much more prevalent among infants than is supposed, and frequently passes unrecognized and undiagnosed. The work of Hess and Fish is referred to. These observers record that it had been the custom to feed the babies of a Hebrew infant asylum in New York upon cows' milk pasteurized at 145° for thirty minutes, and to add fresh orange-juice. Afterwards the fresh orange juice was omitted, and the result was an outbreak of mild scurvy three months later. The symptoms were for the most part only slight; the babies displayed fretfulness, marked pallor, loss of appetite, general ill-health, and cessation of gain in weight and growth in length. In the more severe cases hæmorrhages were noticed, also anæmia and distinct tenderness of joints. All the infants affected were over six months old. The nature of the disorder was made apparent by the rapid cure of all symptoms when orange-juice or other antiscorbutic was restored to the diet, or when raw milk was substituted for the pasteurized.

A. D. Fordyce² reports three cases which presented the usual features, for they occurred during the second six months of life, and followed a long-continued use of patent foods. He points out the importance of pain on moving a limb in an infant of this age as an early sign.

J. Comby³ reports 12 new cases, making a total of only 41 observed by him in Paris over a period of eighteen years. All had been fed with sterilized

flour foods. Signs of rickets were present in nearly every case. The cases had been mistakenly diagnosed as acute articular rheumatism, infectious poly-arthritis, polyneuritis, acute myelitis, infantile paralysis, meningitis, typhoid, osteomyelitis, fracture, syphilitic osteo-periostitis, osteosarcoma, coxalgia, or Pott's disease. He holds, however, that the diagnosis is easy for those who have once seen a case. All that is necessary in treatment is to stop all feeding from tins, returning to **Fresh Milk**, raw or merely boiled, giving two or three teaspoonfuls a day of orange- or grape-juice or lemonade. Meat-juice is unnecessary.

REFERENCES.—¹*Lancet*, 1918, i, 1; ²*Edin. Med. Jour.* 1918, Feb., 110; ³*Arch. de Méd. des Enfants*, 1918, July 20, 337 (abstr. *Jour. Amer. Med. Assoc.* 1917, ii, 1115.)

SEA SICKNESS.

Said to be influenced by **Adrenalin** (p. 1.)

SEBORRHŒIC ERUPTIONS.

E. Graham Little, M.D., F.R.C.P.

In the interesting paper by MacCormac abstracted in the *MEDICAL ANNUAL* last year (p. 485), much prominence was given to the problem of seborrhœic complications in the Army, and Barber and Semon¹ contribute another paper amplifying the consideration of this subject, confining their remarks to the disease as distributed on the head and neck. The authors adopt the view, first expressed by Darier, that there is an underlying constitutional disease responsible for the skin eruption, and (the authors add) for concomitant affections, of which the most important is nasal and pharyngeal catarrh. The authors also endorse Darier's explanation of causation, namely, that sexual development and erroneous diet are the most essential factors, the bacteriological cause, which has been much more prominently emphasized, being of secondary importance. "A careful study of many hundreds of cases of seborrhœic eczema has convinced us that the main factor in their production is a metabolic dyscrasia, or error in biological assimilation, while external irritants, such as parasites, mustard gas, and bacteria, are the excitants, and play the part of spark to powder." The authors endorse Czemy's findings that an 'exudative diathesis' is often associated with an intolerance of carbohydrates, and link up with his observation the facts which they have observed of seborrhœic eczema associated with nasopharyngeal catarrh. They are satisfied that acidosis plays an essential part in the causation, and compare this affection with diabetes in the effect of increasing the proneness to suppuration. They have found the urine constantly hyperacid, and they have obtained remarkable success in treatment with **Alkalies** pushed to the point of producing alkaline urine. The mixture recommended is the following, given three times a day an hour or half an hour before meals:—

R	Sod. Bicarb.	5j	Magnes. Carb.	gr. v
	Potass. Citrat.	gr. xxx	Aq. Chlorof.	5j
	Calc. Lact.	gr. v		

Local applications should also be alkaline, and the following lotion is advised:—

R	Calamin. Præp.	gr. xxx	Ol. Arachis, <i>vel</i> Ol. Olivæ	ad 5j
	Aq. Calcis	5ij		

Most seborrhœic lesions are amenable to this application, which should be renewed not less than twice daily, on lint. When oil is difficult to obtain in sufficient quantity, they have found sodium bicarbonate in 2 per cent solution in water very useful. It must be applied thrice daily at least, as a 'soak' on lint under jaconet, and should be changed once during the night if the lesions are very acute.

At a later stage, when erythema and congestion with irritability of the skin

surface persist, the part should be covered with lint or linen smeared with **Lassar's Paste**. All hairy parts, with the exception of the eyebrows and lashes, should be close cropped or shaved.

Diet is probably a contributory factor in the production of acidosis, carbohydrates and protein in excess, as for example in the Army ration, accounting for its prevalence under active service conditions. The intake of fixed bases in the food, which are supplied chiefly in fruit and vegetables, is the best dietetic means of combating this acidosis.

REFERENCE.—¹*Brit. Med. Jour.* 1918, ii, 245.

SERUM SICKNESS. (See also CEREBROSPINAL FEVER.) J. D. Rolleston, M.D.

The facts and problems of serum sickness are discussed by E. W. Goodall¹ in a paper based on the outcome of twenty-two years' familiarity with the disease as it occurs in the course of the serum treatment of diphtheria.

1. *Serum Sickness after Primary Injections*.—A rash occurs in more than a third of the cases injected; but as a considerable number die before a rash appears, the incidence is best determined from the cases which recover. Of 8726 recoveries among 10,000 consecutive cases of diphtheria treated with serum, a rash occurred in 40.1 per cent; but if the deaths were included, the percentage was 35.02. In the vast majority of cases the rash is either urticaria, or circinate erythema, or a combination of the two. A papular or macular rash somewhat like measles is next most frequent. A scarlatiniform erythema is unusual. Very exceptionally the erythema becomes petechial or purpuric, and very rarely vesicular or bullous. The rash is often accompanied by pyrexia, and serum disease may show itself occasionally by fever without a rash; but such cases are neither common nor easy to diagnose. In some of the more severe cases there is enlargement of the lymphatic glands, especially the cervical, and there may be tonsillitis. Von Pirquet and Schick have shown that there is marked leucopenia due to diminution of the polymorphonuclears. Perspiration is usually pronounced, except in the mildest cases. Albuminuria and vomiting are not uncommon. One of the most frequent complications of serum disease is arthritis, which occurred in 4.3 per cent of Goodall's cases. It is nearly always accompanied by a rash and pyrexia. The joints affected are usually the wrists, elbows, ankles, and knees, but not infrequently the hands, shoulders, and hips are involved. Suppuration is very rare. In none of Goodall's cases was the arthritis accompanied by heart involvement, as in rheumatic fever. The only instance on record is that reported by Rosenhaupt in 1905, in which there was pericardial effusion. Among the rare complications of the serum disease are oedema of the scrotum or penis and transient hæmaturia.

Goodall's figures show that the disease is more frequent in the female than in the male sex, especially in patients over ten years of age. Children are more liable to be affected by a rash, but are less likely to be attacked by arthritis, than adults. In the vast majority of cases there is a distinct period between the injection and the onset of the sickness which is free from any symptoms attributable to the serum. The commonest length of this latent period in Goodall's series was nine days in persons who had not received serum previously.

2. *Serum Sickness in Re-injected Persons*.—Persons who have received serum a second time for a relapse or second attack of diphtheria, actual or supposed, usually show a reaction which is abnormal in the shortening of the latent period, the unusual severity of the attack, and the occasional occurrence of unusual symptoms, such as rigors, muscular twitchings, convulsions, collapse, abdominal pain or diarrhoea.

3. *Abnormal Serum Sickness without Previous Serum Treatment.*—This group has furnished nearly all the instances of death occurring immediately after an injection of serum. The symptoms are sensations of itching and burning, with very acute œdema of the skin and mucous membranes of the nose, throat, and mouth, urgent dyspnoea and cyanosis, and foaming at the mouth. In some cases there is a rash, which is usually urticaria. In fatal cases death may be due to inability to breathe, or there may be convulsions and coma. Respiration stops before the heart ceases to beat. The majority of such cases, especially those which are fatal, occur in asthmatic subjects. Goodall, however, thinks that a few of the cases in which an injection of serum has been followed by serious symptoms are not examples of anaphylaxis, but are due to some accident or pathological state, such as injection of air into a vein, or the status lymphaticus.

Widmer² draws attention to the occurrence of *diarrhœa* in serum disease. Out of 50 cases of serum disease following the intramuscular injection of antitoxin in diphtheria, 36 showed well-marked intestinal symptoms, which were classified as follows: (1) Simple enteritis—26 cases; (2) Membranous enteritis (*a*) with many eosinophils—7 cases, (*b*) without eosinophils—2 cases; (3) Hæmorrhagic enteritis—1 case. The diarrhœa in most of the cases lasted from six to twenty days, occurring as a rule before the other symptoms of the serum disease, and subsided with or outlasted them by a few days. Widmer holds that there is a certain connection between anaphylaxis or anaphylactic enteritis in the dog and the serum disease in man, as shown by eosinophilia in the stools in both conditions.

G. H. Waugh³ records a case of anaphylaxis in a girl, age 17, who died five minutes after an injection of 4000 units of antitoxin for diphtheria. She had had diphtheria ten years previously, when she had been given 2000 units, which, according to the history given, made her very ill. Although she was undoubtedly suffering from diphtheritic toxæmia, there was no sign whatever of cardiac failure. Waugh therefore concludes that death was due to anaphylaxis, of which the following signs were present: (1) Sudden collapse immediately following injection; (2) Marked cyanosis; (3) Arrested respiration, with frothing at the mouth; (4) Post-mortem signs of stasis and pulmonary congestion. Unlike most anaphylactic subjects, the girl had never had asthma, though she was subject to bronchial and nasal catarrh in bad weather.

REFERENCES.—¹*Lancet*, 1918, i, 323, 361; ²*Dent. Arch. f. klin. Med.* 1918, cxxv, 51; ³*Brit. Jour. Child. Dis.* 1918, 37.

SHOCK, SURGICAL.

A. Rendle Short, M.D., F.R.C.S.

The terrible frequency and severity of this condition at the casualty clearing stations and field ambulances of the war areas have produced a deep impression on those who have witnessed it. It is not surprising therefore that the literature for the year contains an unwonted number of thoughtful papers dealing with the subject. Both in Great Britain and America research committees have been formed to collect observations, but neither of these has issued a final report yet. Before the War, interest in the subject appeared to be largely confined to England and America, but now there is an extensive French literature also. Only a few German publications have come to hand.

General Reviews.—The best general reviews of the subject are to be found in a long paper by Roger,¹ which has the advantage of summarizing not only British and American but also French research on the nature and treatment of shock; and in the report² of a conference held in March, 1918, at Paris, and attended principally by American workers. The speakers at the confer-

ence included Major Crile, Lieut. Prince, Major Cannon, Dr. Vincent, Capt. Cowell, Col. Sir Almroth Wright, Dr. Roux-Berger, Capt. Robertson, Major Hamilton Drummond, and members of the Lakeside unit. As a statement of present-day opinion concerning shock in military surgery the report of this conference is of the greatest practical and theoretical importance. We shall have repeated occasion to refer to the views expressed.

Animal Experimentation.—A shock-like condition can be produced in animals by the following methods :—

1. Guthrie³ exposed and crushed the brachial plexus and sciatic nerves. This often fails to bring on a marked fall of blood-pressure. In that case he amputated limbs high up, but the most reliable means is by manipulating the intestines. Intestinal pulling and twisting is the experimental method usually adopted by other workers.

2. H. H. Dale and Laidlaw⁴ have shown that a condition much resembling surgical shock can be induced in animals by histamine poisoning. It is characterized by a fall of blood-pressure and a concentration of the total blood-volume. The fall of blood-pressure is not due to failure of the heart or dilatation of the arteries, but to a paralytic dilatation of the capillaries, so that much of the blood is withdrawn from the functioning circulation, and pooled, as it were, in a backwater.

3. Several workers show that ligature of a limb followed by crushing of the muscles, and then release of the ligature and massage so as to obtain absorption of the crush-products into the circulation, is productive of shock (Turck,⁵ Bayliss,⁶ Cannon⁷). There is a fall of blood-pressure, lowered temperature, and sometimes even death. If the ligature is kept on and amputation performed, no shock symptoms are observed. Grafting in, or injecting extracts of, the crushed muscle, produces the symptoms, and they are not prevented by section of the spinal cord. It is clear, then, that there is a chemical poison at work.

The interesting question arises how far this factor enters into the pathology of shock in war surgery. It has been observed by many that extensive wounds of muscle are apt to produce much shock, and also, as Quénu and Lacoste⁸ argue, that early amputations avert death from shock by removing the damaged mass of muscle.

There can be little doubt that chemical absorption of crush-products produced by autolysis in muscle is responsible for some part of the ill-effects seen in traumatic shock, but it is difficult to believe that it can be the main factor, for the following reasons. Severe shock symptoms occur after wounds of abdominal viscera, manipulations of the intestines, extensive burns, crushing of the chest, amputations at the hip-joint, etc., in which muscle injury plays little if any part. Early amputations to remove pulped limbs after wounding by high explosives save lives principally because they avert death from gas gangrene or acute streptococcal infections. There is evidence that absorption of the toxins of these bacteria may be already taking place within twelve hours of wounding in some cases, and what is called 'delayed shock' is usually an infective toxæmia. Again, there is evidence that the blood of shocked patients or animals is not actively poisonous. Capt. Lindsay and I⁹ injected 10 c.c. of the blood of a man just dead of shock into a rabbit, which was none the worse for it, although 10 c.c. is a large dose for an animal of that weight. Prof. Crile some years ago crossed the circulation of two dogs, by leading the carotid arteries and jugular veins of the one to the other, and found that signs of shock were only induced in the traumatized animal.

4. Erlanger, Gesell, Gasser, and Elliott¹⁰ induced a shock-like condition in animals by obstructing the inferior vena cava, or the aorta, or by large doses

of adrenalin, or by plugging the capillaries of the portal system in the liver. All these act, they maintain, by reducing the total volume of the actively circulating blood. They admit that adrenalin injection does not usually cause shock, and Yandell Henderson¹¹ states that, even when large doses are given continuously, symptoms of shock do not occur.

Wiggers¹² publishes observations on the blood-pressure in the systemic arteries, pulmonary artery, right ventricle, and systemic veins, to see if there is any demonstrable difference between the circulatory signs in hæmorrhage and shock, early or late. All these pressures fall in both conditions, though venous pressure may be raised at first. There is nothing in the circulatory signs studied in this way to draw a distinction between shock and hæmorrhage.

A careful paper by Guthrie,³ whose methods have already been referred to, brings out some interesting points. He has made extensive analyses of the blood in shock, and finds that the acidosis and reduction of the alkali reserve, estimated by Van Slyke's apparatus and other means, which are so widely recognized and have called forth so much interest, do not precede but follow the other signs of shock. Most observers believe that there is reduction of the total blood-volume in shock (personally, I have never regarded this as proved); but Guthrie finds there is a small *increase* of about 20 per cent. Further observations, both in man and animals, are urgently needed on this point, and especially by the newer methods (vital red, etc.). Guthrie has estimated the proportion of blood found in the abdominal viscera after death from shock, and found it only one-seventh of the whole. It used to be believed, following the analogy of the hutch rabbit slung up by the ears until it died, that in shock the patient bled to death into his own abdominal veins; but this observation certainly does not bear out the belief.

Most practical surgeons agree that when a laparotomy is performed on a shocked patient there is no greatly excessive fullness of the abdominal veins, nor is the liver particularly engorged.

Erlanger and Woodyatt¹³ advocate the employment of intravenous injections of glucose spread out over a considerable time. They find the method valuable in restored shocked dogs. For man they recommend 15 to 30 grms. of glucose per hour, given in 18 per cent solution in 100 to 200 c.c. of water. The technical application might, however, be difficult in practice.

McElroy¹⁴ has studied the acidosis problem, and shows that a primary acidosis of the degree frequently observed in shock, experimentally produced, does not give rise to any symptoms. This confirms the general opinion that the acidosis is effect, not cause.

Phenomena of Shock in the Wounded Soldier.—It has been pointed out that quite a number of causes may produce very similar phenomena, all more or less resembling surgical shock. In practice it is common for several such causes to act together. They are:—

1. *Considerable Loss of Blood.*—Loss up to a pint does not by itself harm a healthy man, as all of us know who have been in the habit of taking blood from donors for transfusion.

2. *Toxæmia from Intestinal Paralysis.*—The late 'shock' of abdominal cases is due to this cause.

3. *Concussion.*

4. *Syncope from Emotion.*—This is either transient or fatal.

5. *Toxæmia from Acute Streptococcal Infection or Incipient Gas Gangrene.*—Much of the so-called 'shock' seen in France after the first day was due to toxæmia.

Shock in its purest form is seen in such cases as gunshot wounds of the

abdomen under twenty-four hours, amputation at the hip-joint, and some multiple injuries with fractured femur seen early.

It is extraordinary how patients with identical injuries differ in the degree of shock. Many believe that a lost battle gives rise to more bad cases than a victory. Some observations have been made on the blood-pressure of soldiers under fire, but they are conflicting; according to Cowell¹² it is raised to 140 or 160 mm. of mercury. Porter,¹⁵ on the other hand, gives a lurid description of his experiences in a small dug-out under a heavy German barrage near the Massif de Moronvillers on May 22, 1917. The blood-pressure remained normal both in wounded and unwounded.

It is universally agreed by British, French, and German writers (e.g., Weil¹⁶) that a main factor in producing and maintaining shock in wounded men is cold.

Much work has been done on the manifestations of shock. The clinical signs are well known—weakness, subnormal temperature, low blood-pressure, and the like. Porter believes that the diastolic pressure is more significant than the systolic. Capt. Dukes and I frequently read it, but without finding it to be of any greater value. Delaunay¹⁷ advocates the use of Pachon's oscillogometer, charting the records in a graphic curve.

Cannon² and his co-workers find that the red blood-cell count in the capillaries of the skin and mucous membranes is higher than the count in the veins, which he explains as a pooling or banking up of much of the blood out of the active circulation, as in a backwater. In a few counts made by fellow-workers at a casualty clearing station we found this phenomenon present only once in five cases. Further observations are desirable.

Cannon also points out, and it will readily be accepted, that the alleged accumulation of blood in the abdominal veins and liver is a myth.

A good deal of interest has been aroused by the acidosis of shock. There are several methods of investigating it. Sir Almroth Wright¹⁸ uses a sulphuric acid litmus paper direct test in a capillary glass tube. Cannon and others estimated the alkaline reserve of the blood by the Van Slyke apparatus. Capt. Dukes and I⁹ made quantitative analyses of the ammonia nitrogen in the urine. The acidosis is constant, but it appears to follow, not precede, the fall of blood-pressure, and is probably more the effect than the cause of the shock. It is not due to lactic acid, nor to β -oxybutyric or diacetic acids. It has been suggested that amino-acids are being excreted in excess.

In a few cases in which I have studied microscopical sections of the various nuclei of the brain and spinal cord in patients dead of shock, it appears that the sensory nuclei of the brain show extreme chromatolysis, the spinal-cord cells and motor nuclei not being affected.⁹ The Purkinje cells of the cerebellum, on which Dolley and Crile made their observations, suffer to some extent.

It has been established that in the hæmorrhage-shock syndrome, and apparently also in pure shock, there is a state of extreme muscular contraction of the superficial veins. This may seriously interfere with blood transfusion. I have several times been compelled to use the internal saphena at the groin.

Theories of Shock.—Writers have been cautious in advancing cut-and-dried theories. The older views—paralysis of the vasomotor centre, acapnia theory, suprarenal exhaustion theory, and the like—are more or less abandoned.

Porter,¹⁵ and also Sutton,¹⁹ believe that fat embolism is an important factor in producing the symptoms. Porter remarks that fractured femurs and extensive wounds of the subcutaneous fat furnish a large proportion of the shocked cases. According to Sutton, in 10 per cent of patients with shock

there are fat globules in the blood squeezed out of a sliced lung in the post-mortem room. The theory is not very convincing. The blood of normal persons (my own, for instance) contains visible fat at times. Fat embolism could scarcely explain the shock of a gunshot wound of the abdomen or amputation at the hip-joint.

According to Delaunay,¹⁷ the symptoms are due to auto-intoxication. Some experimental evidence for this has already been mentioned and discussed.

Cannon believes that much of the circulating blood is withdrawn to, and stagnates in, the capillaries, so producing a paucity of efficient circulating oxyhæmoglobin.

Roger,¹ and also Guthrie,³ look upon it as an inhibition or fatigue of first the bulbar centres and also of all the cells of the body, aggravated, later, by lack of oxygen due to failure of the circulation. Roger points out that strychnine spasms are greatly delayed in the shocked animal.

PREVENTION AND TREATMENT.—It is to be feared that in spite of all the research of the workers, young and old, of all the warring nations, we are still too often helpless in the presence of grave shock. Nevertheless, real progress has been made. If cases in which there is a large toxæmic element (intestinal paralysis, early gas gangrene, acute streptococcal infections) are eliminated, the great bulk of those patients who arrive not pulseless at a casualty clearing station can be saved. Unfortunately, the toxæmic cases are very frequent, and can usually be saved only by an amputation, which is apt to be too late.

The pre-war methods of treatment—pituitary, strychnine, alcohol, camphor, saline infusion, and the like—are of very little avail. Patients whose pulses fail on the table during the later stages of an operation often improve remarkably during the stitching up and bandaging, quite apart from any drug-treatment, and the alleged virtues of the above-mentioned remedies are principally, if not entirely, due to this recovery being erroneously attributed to the drug.

Transfusion with Saline helps, but only for a few hours. **Alkaline Transfusion** is probably no better. It has been extensively tried in France.

Bayliss⁶ advises transfusion with 6 per cent **Gum Acacia in Normal Saline**. Given to animals immediately after a big hæmorrhage, it is life-saving; but when some time has elapsed, opinion is divided as to whether it does much good. It is well worthy of trial.

Everyone agrees that **Warmth** and **Quiet** are important. It is more merciful and more valuable to give small doses of **Morphia**, frequently repeated, than to disturb the patient to transfuse with saline. **Blood Transfusion** is the best remedy of all. On this point there is a wide agreement. It is probably more valuable for hæmorrhage than for pure shock. The difficulties of obtaining it during a 'strafe' may be obviated to some extent by the use of preserved blood (*see* **BLOOD TRANSFUSION**).

Porter,¹⁵ following Yandell Henderson's suggestion, claims that the patients may be revived considerably by administering **Carbon Dioxide** to breathe. The advantage of this is to excite deep diaphragmatic respiration, which may raise the blood-pressure by 15 mm. of mercury. He claims that four out of five of his shocked cases treated in this way recovered.

At the casualty clearing station where I was located, and at others, it was found very useful to set apart a shock ward and a shock team during a 'strafe.' The ward was kept warm, dark, and quiet; the beds were heated by a hot-air funnel, and the apparatus for transfusion was all at hand. The team consisted of one or two medical officers, orderlies, and a sister. Blood donors ready tested out were somewhere within easy reach. Shocked

patients went straight to this ward on arrival, and were kept until fit for operation.

REFERENCES.—¹*Rev. de Méd.* 1917, July, Aug., 422; ²*Research Society Reports, Med. Bull.* 1918, April, 417; ³*Jour. Amer. Med. Assoc.* 1917, ii, 1394; ⁴*Jour. Physiol.* 1918, July, lii, 110; ⁵*Med. Rec.* 1918, June, 927; ⁶*Brit. Med. Jour.* 1918, i, 553; ⁷*Med. Bull.* 1918, April, 424; *Jour. Amer. Med. Assoc.* 1918, lxx, 526, 531, 611, 618; ⁸*Presse Méd.* 1918, Feb., 69; ⁹*Brit. Jour. Surg.* 1919, Jan., 403; ¹⁰*Jour. Amer. Med. Assoc.* 1917, ii, 2089; ¹¹*Ibid.* 965; ¹²*Ibid.* 1918, i, 508; ¹³*Ibid.* 1917, Oct., 1410; ¹⁴*Ibid.* 1918, i, 847; ¹⁵*Boston Med. and Surg. Jour.* 1917, ii, 326; 1918, i, 657; 1918, ii, 273; *Ann. Surg.* 1918, July, 76; ¹⁶*Abst. Brit. Med. Jour.* 1917, ii, 564; ¹⁷*Lyon Chir.* 1918, Jan., Feb., 211; Mar., April, 293; ¹⁸*Lancet*, 1918, i, 763; ¹⁹*Brit. Med. Jour.* 1918, Oct., 368; ²⁰*Ann. Surg.* 1917, Sept., 280; ²¹*Amer. Jour. Med. Sci.* 1918, May, 625.

SKIN DISEASES, GENERAL.

E. Graham Little, M.D., F.R.C.P.

Chandler Walker¹ made experimental cutaneous tests with certain pollens and with horse dandruff, in cases where contact with these agencies seemed to produce symptoms of disorder such as asthma, eczema, urticaria, and angioneurotic oedema, and obtained results which convince him that these are common causes of these affections. Exclusion from contact with such should therefore be enjoined on patients.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1918, i, 245.

SKIN GRAFTING.

E. W. Hey Groves, M.S., F.R.C.S.
C. A. Joll, M.S., F.R.C.S.

Masson¹ describes a new method of utilizing the skin available for an auto-plastic or homoplastic graft, by combining the Thiersch and a plan which resembles the Reverdin method, but extra grafts are taken from the area which has just furnished the Thiersch graft. When homoplastic grafts are used, this author tests the blood of both donor and recipient for agglutination, and he claims that this is of great importance for the success of the method, just as it is for transfusion, and he believes that the two are governed by the same principles. In all cases a Wassermann test was used to protect the recipient from danger of acquiring syphilis. As a rule, Masson prefers to scrape away the granulation tissue, and to wait until the application of saline or boracic dressings (hot) produces a layer of healthy granulations surrounded by an epithelial proliferating margin. In the more recent cases he applies **Hot Saline**, **Dakin's Solution**, or **Dichloramine-T**, until the wound is made sterile, as shown by smears taken on three consecutive days. The grafts may then be applied direct to the granulations; or if the latter be exuberant, they may be scraped or rubbed away. Masson says that the Wolff graft, though less liable to take than the others, is essential in extensive areas such as the annular ulcers of the leg. Local anaesthesia is somewhat lukewarmly recommended by this writer. The skin is prepared with iodine in the usual way, and then the Thiersch grafts are cut, and if necessary the same area is used to obtain grafts from the deeper layers by a similar technique (*Plate XLI, A, B*), or small island grafts can be cut from the raw surface. If the wound left by the removal of these grafts is large, it is recommended to excise an elliptical area of the raw surface, and to use the skin so obtained for the preparation of small sectional grafts on the plan described by Colebrook and Fleming (*Plate XLII, C-F*). Masson punctures all large grafts at several spots, to allow for drainage.

Joy² uses **Flavine 1-1000** for the preliminary treatment of the skin during four to seven days before operation, and he avoids the application of dressings direct to the grafted surface by covering the area with inverted boxes of various shapes and sizes; these are sterilized and fixed to the patient by strips of plaster, and the dressing is left on for two to four days..

Wakeley³ contrasts the value of skin grafting with that of **Ambrine** and

PLATE XLI.

MASSON'S METHOD OF SKIN GRAFTING

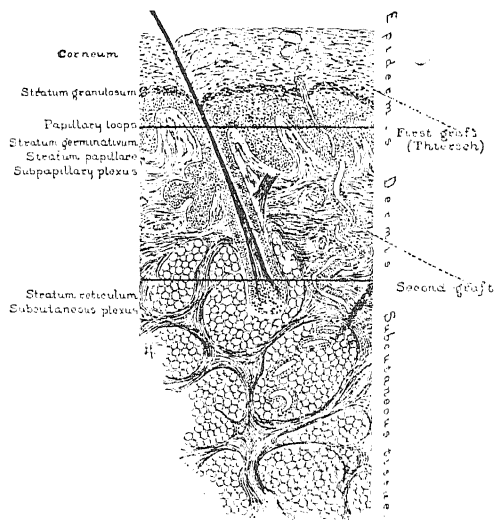


Fig. 1. Normal skin, showing part utilized in Thiersch graft, and the deep part utilized by a new method.

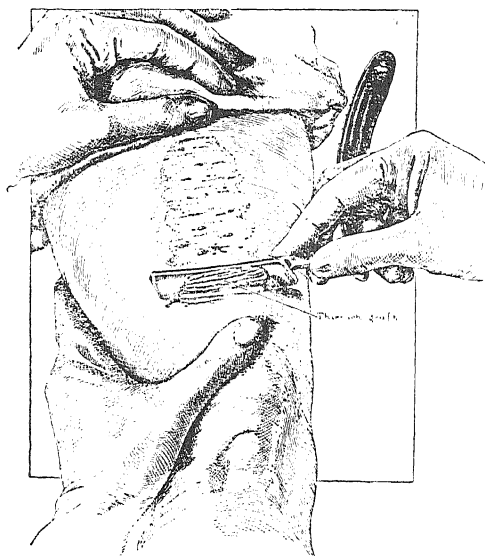


Fig. 2. Ordinary method of obtaining Thiersch graft.

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PLATE XLII.

MASSON'S METHOD OF SKIN GRAFTING—*continued*

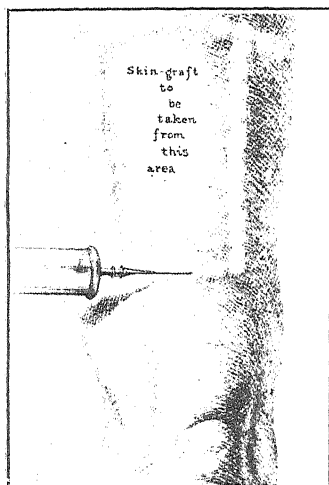


Fig. C. Superficial blocking with local anaesthesia for skin grafting.

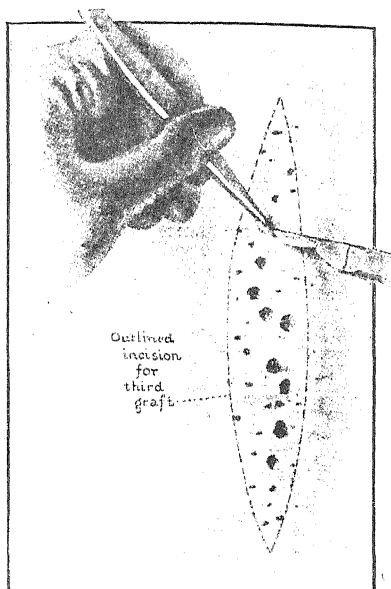


Fig. D.—Further utilization of area from which Thiersch graft has been removed.

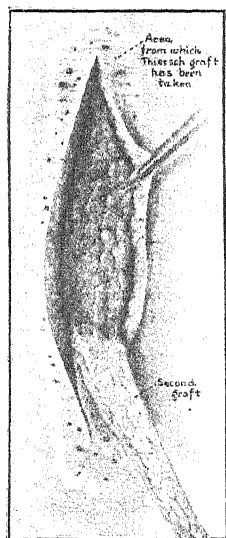


Fig. E.—Excision of retaining layers of skin from surface denuded by Thiersch graft.

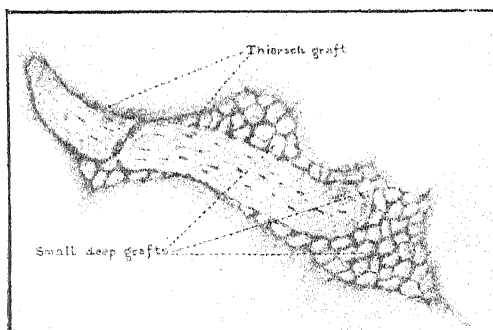


Fig. F.—Wound covered with Thiersch grafts and small deep grafts taken from denuded area.

similar preparations in the treatment of burns, and holds that the former is incomparably the better.

Debat,⁴ in cases of redundant granulations, advises exposure to the air, or, even better, **Hot-air Baths**. In some cases, if the margins are deeply bevelled, the edges should be scarified. Debat recommends grafts $\frac{1}{2}$ in. wide and 2 in. long, consisting of the whole thickness of the skin, minus any trace of subcutaneous fat. Such grafts are applied in series $\frac{1}{2}$ in. apart.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1918, i, 1581; ²*Brit. Med. Jour.* 1917, ii, 857; ³*Lancet*, 1918, i, 736; ⁴*N. Y. Med. Jour.* 1917, ii, 667.

SKIN, STAPHYLOCOCCIC INFECTIONS OF. (See also IMPETIGO.)

E. Graham Little, M.D., F.R.C.P.

Sycosis.—Philip¹ insists on the importance of preventing the spread of sycosis, and gives the following precepts, the most obvious of which is the caution to avoid the barber; civilians and soldiers alike should shave themselves. Since this is rather a counsel of perfection, barbers and persons suffering from sycosis should be instructed how to carry out disinfection, and be provided with disinfectants, soap, and ether in sufficient quantities. Persons suffering from sycosis should not be allowed to enter public shaving saloons, but should have a special barber to attend them. Soldiers and munition workers should be informed about the dissemination and significance of sycosis, and be warned that only an early and properly conducted treatment will bring about a rapid cure, and that neglect of the disease is prejudicial to their families and neighbours. Regimental and sick-club medical officers should send cases of sycosis barbæ to hospital or a skin specialist, without first attempting treatment by unsuitable methods.

The following treatment for sycosis barbæ is recommended by Richter.² In the superficial forms the lesions should be painted for eight to fourteen days with a solution composed of **Potassium Permanganate** 50 parts, **Boric Acid** 30 parts, distilled water 1000 parts. Deep ulcerative sycosis should be treated by removal of hairs in the diseased part, and by daily painting with the above, followed by moist compresses soaked in the following solution: Potassium permanganate 2.5 parts, sodium bicarbonate 10, sodium chloride 0.25, boric acid 1.5, distilled water 1000 parts. The most obstinate and deep sycosis is completely cured in three to five weeks by daily treatment of this kind. The affected area should be washed every five days with water and soap.

Adamson³ points out the serious nature of this condition in its effect of invaliding otherwise able-bodied men for long periods. He insists on the importance of early treatment of the contagious impetigo which is so often the initial cause, and which in its early phases is so amenable to treatment, while in the later stages, when the hair follicle has become deeply infected, the disease is practically incurable. A chronic staphylococcic infection may also follow on a maltreated scabies, a combination which has been especially common in war conditions. (See SCABIES.) The whole secret of success in the treatment of the initial impetigo contagiosa is to remove first of all every trace of crust and every overhanging blister margin. This may be best and simply done by prolonged and frequent mopping with hot water. The patient is made to mop off the crusts by bathing the affected parts for half an hour two or three times daily. At the same time all crusts must be carefully wiped off with wool or picked off with forceps. Immediately after the bathing, the eroded surfaces are mopped with **Lotio Hydrarg. Perchlor.** 1-6000, or with **Lotio Cupri Sulphatis** 1-8000; then an ointment (**Ung. Hydrarg. Ammon. Chlor.**, 10 gr. to 1 oz.) is smeared on, to remain until the next mopping. When the impetigo complicates scabies and involves the limbs and trunk, it may

be necessary to continue the hot baths beyond the three prescribed for the scabies treatment, and to substitute **Ung. Acid. Boric.** for the ung. sulphuris after the third sulphur ointment application. Obstinate patches of ecthyma are best treated by complete removal of the crusts by repeated mopping with hot water, followed by careful and thorough application to the shallow ulcer of **Argent. Nitratis** 15 gr., spirit. ætheris nitrici 1 oz.

When the follicle has become infected, a much more intractable condition results. This author regards vaccines as disappointing and indeed often harmful, and urges that, if given, the doses should always be small, 50 to 150 million weekly. X rays he also regards as a futile proceeding, the disease usually returning with the regrowth of hair. **Epilation** with forceps and disinfection of the surface with **Ung. Hyd. Oleat.** 5 per cent, or **Ung. Iodex**, he finds more effective where the area involved is not too large. For very restricted lesions he recommends the application once or twice weekly of pure **Carbolic Acid** introduced with a match-stick or fine swab.

Staphylococciæ.—The eczematoid impetigos following upon scabies are best treated by the application of an ointment composed of **Pyrogallie Acid** 1 gr., **Ung. Zinc. Oxid.** 1 oz. Small doses of X rays are here also sometimes useful.

Compton¹ describes the results of administration of **Stannoxyd** (Frouin) in the form of tablets in seven cases of staphylococcal infection, five of these being furunculosis. In all, vaccines had been used without effect. Usually eight tablets were given daily, and at the same time pus was evacuated where present and the lesions treated by swabbing with tincture of iodine and applying dry dressings. These results are distinctly encouraging. (*See also* p. 7.)

Furunculosis.—Whitney⁵ recommends two methods of local treatment of boils, according as the lesion is early or advanced. In the first event, a hard-pointed stick, such as a sharpened match-end, is dipped into pure **Carbolic Acid** and thrust deeply into the boil, this action being repeated four or five times until a depth of $\frac{1}{4}$ to $\frac{1}{2}$ in. is obtained. The boil is usually aborted if treated early enough. When induration and tenderness are present, the procedure recommended is to make a crucial incision into the boil under cocaine, and the cavity made by the incisions is then packed tightly with gauze, which is left *in situ* for twenty-four to forty-eight hours. A second or third packing may be necessary. No other dressing is applied.

Sajous⁶ quotes the following method, employed by Marcus, of *local disinfection of the boil*. Having sought out the most sensitive follicle, he introduces a fine **Epilation Needle** connected with the negative pole of a battery. The initial current of 1 or 2 ma. is gradually increased to 10 ma., and the needle worked in by a rotary movement. Nascent hydrogen is liberated in the boil from the negative pole and bubbles out, carrying with it all free material. After from one to three minutes the needle is taken out, any discharge removed from the affected area, and the needle reinserted in connection with the positive pole. The current being increased to 10 ma., oxygen and ozone are set free from this pole and disinfect the lesion, after which the current is reversed again to generate hydrogen and clean out any remaining debris. The treatment is repeated twice daily, and, according to its sponsor, procures prompt subsidence and healing.

Adamson⁷ recommends the following local treatment: Larger boils may be fomented, but they may generally be made to dry up rapidly by the following method: Into the central point of the boil a pointed match-stick which has been dipped in pure **Carbolic** is gently inserted. This smarts at first, but the carbolic acid soon numbs the pain. The match-stick is again dipped into the carbolic and put more deeply into the boil. It will then be found that an open-

ing has been made, and that the pus can be gently squeezed out. A small wad of absorbent wool is now tightly wound round the ends of a fine forceps and dipped into pure carbolic. The carbolic-soaked wad is then used to mop out thoroughly the cavity of the boil, and finally some pure carbolic is painted over the surface of the boil and a piece of dry wool put over it. In twenty-four hours the boil will have almost subsided, and in a day or two it will have disappeared. By diligently attacking every fresh boil in this way we may succeed eventually in stamping out the infection, but disappointment sometimes follows by a recrudescence of crops of boils at a later period.

McDonagh⁸ introduced the method of intramuscular injection of **Collosof Manganese** (Crookes), and describes his practice thus: "Often one injection of colloidal manganese (3 c.c.) will clear up all the boils in three days, the improvement being even distinctly manifest twelve to twenty-four hours after the injection. If I think one injection will suffice, I employ 3 c.c. If I think more will be required, I commence with 1.5 c.c., repeat the same dose the next day, and 3 c.c. two or three days later. If a single dose of 3 c.c. will not produce the desired result, the same dose or 4 c.c. injected three or four days later will suffice. It is not wise to begin with a dose exceeding 3 c.c."

It is to be noted that these doses refer to the older solution prepared by the Crookes laboratory. With the later modification of using two solutions freshly mixed the dose of the combined solutions is half that previously advised. Morris⁹ reports excellent results with this latter method in four cases of very intractable furunculosis.

Dikshit¹⁰ succeeded in three cases in curing extensive carbuncles and boils by **Cupping** with Bier's suction cups applied for from five minutes to half an hour at a time, and dressing with a **Glycerin Poultice**, consisting of gauze soaked with glycerin, and covered with oil-silk. Pain was eased immediately, and cure was rapid.

REFERENCES.—¹*Dermat. Woch.* 1918, 66, 283 (abstr. *Med. Supp. Rev. Foreign Press*, 1918, Oct. 1, 350); ²*Ibid.*; ³*Brit. Med. Jour.* 1918, i, 8; ⁴*Lancet*, 1918, i, 99; ⁵*Ther. Gaz.* 1918, April 15, 282; ⁶*N. Y. Med. Jour.* 1917, ii, 712; ⁷*Brit. Med. Jour.* 1918, i, 8; ⁸*Med. Press and Circ.* 1917, Dec. 5, 431; ⁹*Brit. Med. Jour.* 1918, i, 446; ¹⁰*Ind. Med. Gaz.* 1918, April, 139.

SKIN, STREPTOCOCCIC INFECTIONS OF. *E. Graham Little, M.D., F.R.C.P.*

Mauté¹ advises application of solutions of **Copper Sulphate** to the parts affected. Compresses soaked in solutions beginning with the strength of 1-500, increased ultimately to 1-100, are worn and changed twice daily. **Intravenous Injection of Copper Salts** is a powerful adjuvant of the treatment. A 4 per cent watery solution of ammoniacal sulphate of copper was used in doses of 2 to 20 cgrms. given daily or every two days. The intravenous treatment was also very successful without the external treatment. (*See p. 2.*)

REFERENCE.—¹*Presse Méd.* 1918, 377 (abstr. *Med. Supp. Rev. Foreign Press*, 1918, Oct. 1, 351).

SKIN, TUMOURS OF.

E. Graham Little, M.D., F.R.C.P.

Pusey¹ records a very remarkable case of tumour-like growths on the face, upper arms, back, and buttocks of a man, age 37, who had suffered from the condition for fifteen years. They were raised, oval, or hemispherical tumours, which could be reduced by light pressure over them or by stretching the skin. Histologically they were proved to be hernia-like swellings, the elastic tissue in the site of the lesion being absent and thus allowing the epidermis to bulge outwards through pressure from below. The condition is probably due to a congenital defect, and was first described by Schweninger and Buzzi, and remains extremely rare. Treatment was not attempted.

Cancer of the Skin.—Ravogli² advises removal of tissue by the **Curette** as the most practical method of dealing with superficial cutaneous cancer, and gives the following detailed technique: When operating on epithelioma of the skin or of the mucous membrane, the surface is thoroughly washed with green soap and water. All crusts and secretions are completely removed. A 5 per cent solution of cocaine or ethyl chloride is applied to prevent pain. With a sharp curette the cancer is scraped off until by passing the finger over the surface it is felt to be perfectly smooth. In scraping, care has to be taken to remove all hard particles from the edges and also from the bottom of the growth. If the curette cannot remove all, then the scissors will finish the work. In the writer's experience the curette is the great instrument to remove cutaneous cancer. It removes only the diseased tissues, and scrapes out from the connective tissues the nests of granulations of epithelial cells, which will never withstand its action. When the surface has been entirely cleaned of all diseased particles, and when passing the finger over it, it is found perfectly smooth, cotton saturated with solution of cocaine 5 per cent is again applied for a few minutes longer. The surface is dried with sponge, and a tampon saturated with the following mixture, prepared at the moment of using, is applied: Formaldehyde 2 parts, lysol 2 parts, ferric perchloride 1 part. This forms a thick greenish mixture, which can be applied on a piece of cotton or on cotton twisted on an applicator. It is necessary to be careful not to spill the fluid on the healthy skin. Also, when operating near the eyes, nose, or mouth, pads of cotton or gauze have to be used in order to prevent the fumes of formaldehyde from irritating the mucous membranes. When the mixture is allowed to remain a few hours in an open glass it turns to a dark-brown colour and loses its efficacy. Sometimes the application of the formaldehyde mixture is repeated after eight or ten days, until the surface has perfectly healed up.

For dressing the resulting wound a salve is made of 1 dr. ichthyol and 1 dr. unguent. diachylon Hebra. This is spread on a piece of gauze and applied covering the surface. This plaster covers and protects the wound, favours the sloughing of the necrotized tissues, and prevents the formation of crusts.

Arsenical Cancer.—De Silva³ examines the evidence for attributing to the administration of arsenic of cancerous growths in the course of diseases for which arsenic is often given over prolonged periods, e.g., psoriasis. He considers there is more reason to incriminate the local applications which for the most part accompany the internal medication, such as tar and chrysarobin, and that arsenic only acts in preparing a favourable soil.

Multiple Keloids.—Lopez-Silvero⁴ records two cases of this affection, both following on acne vulgaris, a rare observation if one considers the frequency of acne vulgaris. The author tried thiosinamine in 10 per cent solution injected locally, without result. Better success was obtained with linear and punctate **Scarifications**, followed by wet or dry **Boric Acid** dressings.

REFERENCES.—¹*Jour. Cutan. Dis.* 1917, 582; ²*Ther. Gaz.* 1918, Jan. 15, 71; ³*Med. Press and Circ.* 1918, March 27, 243; ⁴*Med. Rec.* 1917, ii, 673.

SKIN AND VENEREAL DISEASE, COUNTERFEIT.

E. Graham Little, M.D., F.R.C.P.

Burnier¹ has a most interesting paper on this subject well worthy of perusal. Gonorrhœal discharges may be simulated by urethral injections of chemical substances, e.g. soap. Or the discharge may be renewed by alcoholic excess, by masturbation, by purposeful neglect of treatment, or, it is suggested, by voluntary reinfection, women affected with the disease commanding a premium from the malingerer for successful infection. Syphilitic lesions are

simulated by the application of a hot cigar end to the mucous membrane of mouth or penis. This practice is most successful in old syphilitics, who wish to secure admission to hospital. The lesion is usually more superficial than the real mucous patch, lacks the opalescent surface, and is often of a sharpness of outline to excite suspicion. Soft sores are similarly simulated. Pustular dermatitis is best imitated by application of croton oil and thapsia, by mineral oils impregnated with euphorbia, or ranunculus. Acute erysipeloid eruptions may be produced by application of a large variety of irritants, e.g., surgical antiseptics of which the malingerer may have learnt the effect in previous admissions to hospital. Bullous eruptions may be produced by various caustic acids, and by a large group of vesicating concoctions prepared from plants. The note of all these eruptions is the facility with which they are cured by simple occlusion of the parts. Ulcers simulating syphilitic and varicose conditions may be caused by various caustics, e.g., silver nitrate, nitric, sulphuric, hydrochloric, and oxalic acids. Abscesses may be started by introduction of septic or irritant substances subcutaneously. An experience is quoted of fifteen cases traced to the introduction under the skin of tartar scraped from the teeth, by which the most formidable and even fatal septic inoculations may be made. Œdema may be brought about by wearing a tight bandage round the limb, and the œdema thus produced may persist after the tell-tale ring of the bandage has vanished. A localized œdema may be caused by repeated 'autocontusion,' as for example with blows on a selected site with a round object such as a bottle, kept up for a quarter of an hour or so daily. Here also protection of the part produces a speedy cure, and this device is in fact the sovereign remedy in all these cases. Plaster-of-Paris dressings may be perforated by the needle of the malingerer armed with an irritant injection, and it is recommended to introduce a sheet of paper, perforation of which will reveal the trick, or actually to enclose the plaster with metal sheets. The author concludes with the confession that the profession is in fact badly equipped against the experienced counterfeiter.

REFERENCE.—¹*Presse Méd.* 1918, Sept. 23, 493.

SKULL, SURGERY OF. (*See* HEAD, SURGERY OF.)

SLEEPING SICKNESS. (*See* TRYPANOSOMIASIS.)

SMALL-POX. (*See also* VACCINATION.)

J. D. Rolleston, M.D.

SYMPTOMS.—In his account of the recent small outbreak of small-pox in the East End of London, H. W. L. Barlow¹ states that it was mainly an affection of children. Of the first 30 patients, 14 were under fifteen, 10 being under ten years of age, and 2 infants. Only one case proved fatal. The combination of a considerable degree of infectivity with rather low virulence seems to have been a characteristic of the epidemic. Of the 14 cases under fifteen, 5 had never been vaccinated at all, or only after the commencement of the actual illness, and 9 were vaccinated for the first time in the incubation period. The distribution of the eruption as a rule followed that prevailing in the adult, the face, back, and extremities being most affected, and the abdomen least; the exceptions were due to conditions of skin irritation common in infants. The duration of the initial illness appears to have been normal. The secondary fever was slight, and the constitutional disturbance hardly exceeded that seen in varicella, with a rash of equal extent.

Bonnamour² describes an outbreak of small-pox which occurred in the Lyons district between November, 1917, and February, 1918. Owing to the prompt vaccination of the civil and military population the number of cases was con-

fined to 32; but the epidemic, though small, was fairly severe. Of the cases, 5 were hemorrhagic, 10 confluent, and 16 discrete. The mortality was 21.8 per cent. That an extensive epidemic would have occurred but for the precautions taken was shown by the remarkably high percentage of successful vaccinations. The small number of small-pox cases on this occasion contrasts with the great epidemic at Lyons in 1870-71, when the spread of the disease was undoubtedly due to neglect of vaccination, as only 7860 persons were vaccinated in the whole of the Rhone district, as compared with considerably over a million in 1917-18.

The arrival of infected Wolhynian refugees in East Prussia in 1916 was followed by an outbreak of small-pox in various parts of Germany, especially in the west and in some of the eastern provinces. In an address delivered on Sept. 23, 1917, Kirchner³ stated that 400 cases of small-pox with 40 deaths had occurred in Berlin during the last nine months, and in the whole of Germany there had been 4000 cases, with rather more than 400 deaths during the same period. He added that these figures were quite insignificant compared with the annual mortality in Germany from whooping-cough, measles, scarlet fever, and especially tuberculosis. The satisfactory state of vaccination among the great majority of the German nation prevented a more extensive epidemic, and whenever the disease occurred, those insufficiently vaccinated were the victims.

An outbreak of abortive small-pox among soldiers and civilians is reported by Klaholt.¹ The disease always began suddenly, with pain in the back and limbs, and the constitutional symptoms were usually very severe, but rapidly disappeared, and it was rare for the fever and pain to last longer than the third day. The characteristic eruption was abortive in every case. The number of eruptive elements was always very small. In one case there was only a single vesicle on the buccal mucosa and two papules on the right shoulder, and in another case there was no eruption whatever. The papules were for the most part very small, and often subsided without developing into vesicles. The eruption usually appeared on the third day, but in one case it came out at the end of the second day, and in a third at the end of the fifth day. The diagnosis was facilitated by the simultaneous occurrence of typical cases of small-pox.

TREATMENT.—G. H. Mead⁵ finds that 2 per cent **Carbolic Lotion** has a very soothing effect on the burning and itching caused by the eruption. **Eucalyptus Oil** sprinkled on the floor and bedding drowns the fœtor, and causes a soothing atmosphere for the patient's respiratory passages, which are frequently more or less affected.

REFERENCES.—¹*Brit. Jour. Child. Dis.* 1918, 110; ²*Lyon Méd.* 1918, cxxvii, 299; ³*Zeits. f. ärztl. Fortbild.* 1917, 453; ⁴*Zeits. f. Med. Beamte*, 1918, 196; ⁵*Lancet*, 1918, ii, 206.

SOLDIER'S HEART.

Carey Coombs, M.D., F.R.C.P.

This is going to be a very important subject for consideration during the next few years. As Lewis¹ shows, 'heart disease' ranks third (after wounds and chest diseases) as a cause of invaliding from the army, and these large numbers will be enormously reinforced as men, who have been just capable of 'carrying on,' and no more, are demobilized. We are therefore very fortunate in having Lewis's book available. It is quite small, but full of sound wisdom and reliable information. So condensed is it that it does not lend itself to abstraction, but a few lines may serve to indicate the main argument.

Of the men sent down from active service on account of cardiac symptoms,

only a small proportion are found to have organic lesions. The first line of inquiry therefore is anatomical: Do the physical signs show gross anatomical lesions of the heart? In the vast majority the answer is 'No.' But even so, a good deal of skill is required to separate out this small group of organic cases. Lewis's advice in this connection contains many interesting observations.

Coming next to the larger group, labelled cases of 'D.A.H.' (disordered action of heart) in the army, we have to classify them in grades of severity. In order to do this, two lines of inquiry are pursued, the etiological and the functional. It is his insistence on this latter that is the chief characteristic of Lewis's book. The symptoms of the 'irritable hearts' of military medicine are just those that are evoked in a healthy man by strenuous effort; hence the term 'effort syndrome.' But in the exhausted soldier these symptoms are far too readily produced. The worst cases are, therefore, those in whom the symptoms are practically incessant, not demanding muscular effort or nervous excitement for their provocation; while at the other end of the scale are men who are scarcely separable from the normal. Between these extremes lies a perfectly graded scale of cases. And, moreover, as the patient improves, he passes gradually up the scale, in that it takes more and more effort to provoke symptoms. It is this fact that forms the basis of Lewis's highly successful plan for restoring patients to military efficiency. By a carefully graded scheme of exercise the man is 'promoted' until fit for some sort of duty. Of course a certain percentage prove insusceptible of improvement. These must be invalided from the army, and this raises two very important questions: How far is the man incapacitated, and to what extent is military service responsible for his disability? Lewis devotes a whole chapter to these questions. He concludes that the degree of incapacity varies from 20 to 50 per cent for six to twelve months. The degree of disability in the various types of organic disease is also tabulated, and for this passage alone—not counting all the invaluable hints on diagnosis which it contains—Dr. Lewis's book is essential to every medical man who has to assess the degree of incapacity in such cases.

A number of papers bearing on the causation of this disorder must be briefly considered.

ETIOLOGY.—There appears no consensus of opinion even yet as to the actual means by which military service establishes the syndrome. There are many possible factors, and some observers are predisposed to give the first place to one of these, others to another. Jepps and Meakins² afford some support to the infective theory by declaring that "symptoms of irritable heart in amœbic dysentery carriers are reduced in a large number of those patients who have been cured of the amœbic infection." Oppenheimer and Rothschild³ produce interesting figures in proof of their contention that the syndrome is often associated with the psychoneuroses of war, conditions partly inherent in the man's make-up, partly an inevitable result of the mental stress of modern war. Fraser and Wilson¹ experimented with apocodeine and adrenalin; they find that the 'D.A.H.' patient reacts more readily to these drugs, which act on the sympathetic nervous system, than the healthy subject does, and they conclude that in these people the sympathetic system is relatively unstable. Hume³ sums up the whole matter by saying that the causal factors may be inherited or acquired, myocardial or nervous; that these factors are combined in different proportions in different cases; and that it does not much matter what the precise combination of factors is in any given case, since treatment is the same for all. He goes on to assign the first place to the treatment of the psychoneurotic factor, and probably the conclusion of most of us is, that this factor ranks first. There is also a myocardial factor in some cases, and possibly also a sympathetic; but the chief thing is psychological instability, inherited or

acquired or both. In support of this may be quoted the wide extension of the syndrome to the civil population during the fourth year of war.

TREATMENT.—Fortunately, the main problem before us is no longer that of bringing these men back to a state of fitness for military service. Nevertheless, that of refitting them for civil life is no less urgent, and in some respects more complex. Unless some organized plan is adopted many men will drift into a condition of invalidism, adding to the State's liabilities instead of being restored in some measure to the credit side of the balance. It may be taken as an axiom that not a single one of these men ought to become permanently unfit for work of any kind. Further, the State which pays their pensions has a right to demand that every reasonable effort be made to increase their efficiency. Finally, work carried on under adequate observation is not only the means of testing efficiency but also the sole plan of cure. In the majority of men, common-sense observation of their reaction to quiet tasks in the ordinary labour market will probably suffice. In the severer cases, however, it is necessary to devise some means of re-education, psychical as well as physical, such as might well be provided by a sojourn in hospitals with workshops and educational schemes of the kind that has sprung up in connection with the 'special military surgical' hospitals of this country.

But whether the man be treated in hospital, or seen by his own medical man from time to time while he carries on some form of employment, certain general principles hold good.

1. The doctor must persuade the patient that his heart is only temporarily disordered, not permanently diseased. The label 'D.A.H.' has done incalculable harm, because it frightens the man into a conviction that there is something wrong with his heart. With most patients a frank explanation of the position is necessary in order to insure his co-operation in a plan of cure; and indeed the plan of cure depends largely on persistence on the part of the doctor in optimistic suggestion—a valuable form of psychotherapy.

2. Other sources of mental perturbation must be sought for and removed if possible. The end of the war will no doubt do this for a large number of men, by setting at rest the anxieties and fears that are begotten by the uncertainties and hazards of active service.

3. The patient's complaints must be listened to. To give him an unsympathetic reception is to court failure, for he turns away with the silent conviction that the doctor does not understand his case.

4. The capacity for work should be systematically gauged by periodical inquiry into subjective symptoms, backed by observation of cardiac capacity or measured by reaction to simple standard tests, such as running up a flight of stairs, marking time at a fixed rate, and so on. The acceleration of the pulse and the rate of its return to normal, with objective evidences of dyspnoea, furnish the best indices. The ordinary physical examination of the heart gives practically no help. Blood-pressure tests and graphic records of cardiac movements are unnecessary, and even harmful, as unduly directing the patient's attention to his heart.

5. The patient must be properly fed, and not allowed to smoke too much. Drugs are of no use except in cases where underlying infections, such as dysentery and malaria, have to be treated.

Many men invalidated from the Services on account of organic heart disease are susceptible of improvement by a similar plan of treatment—graduated work backed by optimistic suggestion.

REFERENCES.—¹"The Soldier's Heart and the Effort Syndrome" (Shaw and Sons, London, 1918); ²*Brit. Med. Jour.* 1917, ii, 645; ³*Ibid.* 1918, ii, 29; ⁴*Ibid.* 27; ⁵*Lancet*, 1918, i, 529.

SPINE, SURGERY OF. (*See also* TUBERCULOSIS, SURGICAL.)*J. Ramsay Hunt, M.D.*

Operative Treatment of Fracture of the Spine uncomplicated by Cord Injury.—Brackett, Mixter, and Wilson¹ have made a suggestive study of this subject. During the past few years, the profession has learned that fracture of the spine is a much more frequent injury than was at first supposed. Many of the cases do not give the cardinal symptoms, and it is only by the routine use of the *x* rays in injuries of the back that we are learning to recognize them. Many of the cases of so-called 'back strain,' 'railway spine,' etc., in which the symptoms were considered to be largely functional, we are now agreed are caused by definite injury to the spinal column itself. A surprisingly large number of these are quite free from cord or nerve-root symptoms, and, in many, such symptoms are present to a slight degree, and disappear in the early days after the injury. A study of *old* cases of fracture demonstrates that a large majority suffer a prolonged and permanent disability, and that this disability is due to an interference with the function of the spinal column, and not with the cord, the meninges, or the nerve-roots. Since such a large number show this long and permanent disability, even with careful supportive treatment, and also since the disability is due, in part at least, to the interference with the weight-bearing function of the spinal column, it becomes a vital question whether these cases should not have the benefit of operative treatment, with the object of firmly fixing the spine at the site of fracture. The fixation of the spine by an internal splint, inserting the single graft in the spinous process by the method of Albee, or by the double graft on either side of the spinous processes, or by ankylosis according to the method of Hibbs, are all well enough established to ensure the result of a stiffened area. This has already been done by the writers in a number of cases, and the object of the study is to determine by a comparison of the results, in non-operative and operative cases, whether it is advisable to recommend the operative procedure in cases of fractured spine, and if so, in which cases, and when.

They have studied 27 cases. Of these, 10 were of the dorsal, and 17 of the lumbar spine. Of this total number, 9 cases have been treated by a bone-graft, inlaid in the split spinous processes, extending two vertebrae above and two below the site of fracture; the cases were kept recumbent in a plaster shell or jacket for two months after operation. Of these, 5 had had mechanical treatment and were still disabled; the remaining 4 were operated on in the early stages (within eight weeks), and can be grouped as fresh cases or cases untreated by mechanical measures.

The evidence from the study of the foregoing cases is strongly in favour of early operative action in :—

1. Fresh fractures: (a) Crushed fracture of the bodies of one or more vertebrae, associated with dis-alignment of fragments, particularly with involvement of any part of the laminae; (b) Fracture of the fifth lumbar, of any part, but particularly with involvement of the laminae; (c) Fracture of the body showing increasing knuckle, abnormal mobility at point of fracture, or complicated with rupture of the supra- or interspinous ligaments.

2. Old fracture cases which show persistent disability, as evidenced by inability to work, accompanied by continuance of pain, local or referred, and with general back weakness. Operation in the decade between fifty and sixty does not seem to be contraindicated. The social position may at times have influence in directing for or against operation, for when the most rigid early care can be given, much more might be expected from early fixation treatment. Freedom from pain, however, in the early weeks of recumbent and fixation treatment may be misleading, for it is possible that even with

the relief of all symptoms during the period of recumbency, the pain may return, and cause disability when the patient becomes ambulatory and begins to use the spinal column.

Operative Indications and Contra-indications in Fracture of the Spine with Cord Symptoms.—C. A. Elsberg² says there is no question in surgery in which there has been more difference of opinion than the subject of operative interference in fresh fractures of the spine with cord symptoms. Just as in the late War the writers on injuries of the spine by bullets and high explosives are divided into two camps—some advising extreme conservation, others recommending surgical interference in almost all of the patients—so, in the injuries of the spine which occur in civil life, there are two groups of surgeons, the radicals and the conservatives. There are, however, cases of spinal injury—and we see them in fractures of the spine in civil life as well as in the injuries of war—in which at first the symptoms are those of a complete transverse spinal lesion, but in which, after the expiration of days, weeks, or months, a considerable or perhaps complete return of power and sensation occurs. These patients suffer either from an injury of part of the cord with concussion, or entirely from spinal concussion, with a resulting nerve-block. In the latter condition complete restoration of health is possible. The crux of the entire matter lies in the question, Can we distinguish between a physical interruption of all of the cord fibres at any level, and a temporary nerve-block due to œdema of the cord or other temporary condition? Apparently, up to the present time, the clinical differentiation is often impossible, and a large number of surgeons believe, therefore, that exploratory operations are justifiable. These surgeons argue that, if a transverse lesion of the cord exists, the condition is anyway a hopeless one, and operative interference will do no harm.

Elsberg holds that in cervical and dorsal injuries, with transverse cord symptoms, an operation should never be performed until distinct and definite signs of returning sensation and reflexes give proof that part of the transverse diameter of the cord is intact. In crushing injuries of the lumbar vertebrae, on the other hand, in which the roots of the cauda equina are affected, a laminectomy should always be performed as soon as shock has been overcome and an x-ray picture has been taken. There is considerable experimental and clinical evidence to show that regeneration of divided caudal nerves can occur, and laminectomy and suture of the divided nerve-ends should be performed. Injuries of the roots of the cauda equina are very apt to be followed by most distressing root neuralgias and by permanent vesical incontinence. Therefore the nerve-roots should be freed from all pressure by a wide decompressive laminectomy, and the ends of divided roots should be united by suture. For these reasons the injuries of the cauda equina should be subjected to early operative interference, no matter how 'complete' the symptoms.

In *partial lesions of the cord* the problem is an entirely different one. If the injury has not been severe enough to interfere with all the cord functions, pressure by dislocated or fractured bone may be contributing very much to the symptoms, and the relief of this pressure by a wide decompressive laminectomy is certain to be of great benefit.

The decompressive incision of the cord on its dorsal surface near the posterior median fissure, suggested by Allen, may be tried in those patients in whom the cord is found to be œdematous and swollen. In some of these patients an intramedullary collection of blood can be removed by aspiration with a fine needle, and the harmful effects of an intramedullary collection of blood—a secondary gliosis or a progressive hæmatomyelia—can be prevented or reduced to a minimum.

If none of the conditions that have just been mentioned exist, and if the spinal tissue is not compressed by dislocated or by fractured bone, the cord may be angulated, or the spinal canal may be much narrowed. The removal of these abnormal conditions by a wide decompressive laminectomy, by the removal of a projecting spicula of bone from the posterior surface of the body of a vertebra, etc., will prevent secondary softening.

Spina Bifida Occulta.—Brickner³ gives an interesting account of his experience with this condition, reporting a number of cases, profusely illustrated. By spina bifida one ordinarily means a cleft or deficiency in the bony column, with a lesion of the spinal cord or its membranes—usually a protrusion (meningocele, myelocoele, or meningomyelocoele). This is, he thinks, a wrong use of the words. Spina bifida means bifid spine, and that individual has a spina bifida who has a cleft in the spine, whether or not there is protrusion of the spinal-cord structures. Virchow reported in 1875 what was supposed to be the first case observed; he coined the term ‘spina bifida occulta’ to indicate a type of spina bifida in which the lesion was concealed beneath the skin. Up to 1910 Brickner found recorded about 85 cases of this type. In these the lesion was indicated externally most often by a distinct hypertrichosis over the cleft, somewhat less often by a congenital lipoma symmetrically situated over the cleft, occasionally by a naevus, telangiectasis, or scar, or sometimes by a combination of these. Such a spina bifida occulta is most often found in the lumbar or lumbosacral region, but it may occur in the dorsal or even the cervical region. It usually involves only a few vertebral arches, but it may extend through the greater part of the spinal column. In several cases of spina bifida occulta, scoliosis or other spinal deformity is also present, and sometimes there are other congenital malformations. At operations and autopsies these abnormalities have been found: A cleft of varying length or breadth in one or more arches, accompanied by one of the following conditions: (1) The cleft may give passage to a distinct meningocele; (2) The cleft is closed by a tough membrane adherent to the overlying skin or non-encapsulated fat and connective tissue; (3) The membrane is perforated by a dense band attached to the subcutaneous tissues without and compressing the cord structures within; (4) Lipomatous tissue within the canal is concealed by this membrane; (5) The cleft discloses the bulging dura mater; (6) An exostosis within the canal compromises the cord tissues; (7) A myofibrolipoma extends through the cleft into the bony canal, distorting and compressing the cord and its nerve-roots; (8) Dilatation of the medullary canal; (9) Degeneration of cord tracts.

The following *clinical types* of occult spina bifida may be recognized: (1) With external signs, with symptoms; (2) With external signs, without symptoms; (3) Without external signs, with symptoms; (4) Without external signs, without symptoms.

Symptoms usually appear during adolescence or early adult life, but not rarely they develop in childhood, and occasionally they first appear during middle life. They may be one or more of the following: Incontinence of bladder or rectum; sensory paralyses; motor paralyses; disturbances of the reflexes; trophic ulcerations and gangrene. Symptomatically, therefore, spina bifida and spina bifida occulta are one. It must be noted, too, that pathologically spina bifida and spina bifida occulta do not greatly differ. Tumour tissue sometimes accompanies evident spina bifida; hypertrichosis sometimes does; an evident meningocele is occasionally partially concealed by a congenital lipoma; and, finally, there are reasons for believing that a spina bifida sometimes shrinks, leaving only scar tissue or other index to a spina bifida occulta.

Brickner believes that the following are legitimate indications for operation: (1) In infants and children, spina bifida occulta with congenital lipoma or hypertrichosis, even though without any symptoms—to reduce the spinal hernia into the canal or to meet any other indication that is found, in the hope of obviating the development of symptoms during adolescence; (2) In adults, spina bifida occulta with sufficiently serious and especially with progressive symptoms, and this should apply whether or not the spina bifida occulta is marked by external signs (lipoma, hypertrichosis).

The author, in concluding his paper, says: "In making this presentation of a condition that has for so many years interested me, it has been my purpose to call attention to the four groups into which it seems to me we may clinically divide spina bifida occulta, and to suggest the advisability of a röntgenographic examination for such a condition in all cases of sphincteric, sensory, trophic, or motor disturbances that might thus be explained, even though there is no external manifestation to suggest its presence."

Laminectomy under Regional Anaesthesia.—Frazier¹ has perfected a method which may be useful where the use of a general anaesthetic is contra-indicated. While regional anaesthesia alone is mentioned in the title of his paper, it may, he says, be necessary to fall back upon certain supplemental measures, such as infiltration anaesthesia, nitrous-oxide anaesthesia, and later on the stovaine block, i.e., touching the posterior roots with stovaine solution in order to prevent shock.

Preliminary to the operation, **Morphine Sulphate** gr. $\frac{1}{6}$ and **Scopolamine** gr. $\frac{1}{200}$ are given hypodermically, and if necessary $\frac{1}{8}$ gr. of morphine may be given during the operation. With the patient in position, a vertical line is drawn corresponding to the line of the spinous processes. Parallel to this median line are drawn two vertical lines 2.9 cms. to either side, and at a point corresponding to the space between the transverse processes a transverse line is projected at right angles to the mid-line. The intersection of the transverse and lateral vertical lines marks the points at which the needle is introduced. After the location of the first intertransverse space has been identified by the successful injection of one nerve, as many more transverse lines are projected as there are nerves to be injected, at a distance of 2.5 cms. above or below the first point of injection. Here again the intersection of transverse and vertical lines marks the points of successive injection. With these topographical landmarks the surgeon proceeds with the injection, provided with a solution of 0.5 **Novocain**, a hypodermic needle, one platinum needle, a Record syringe, a centimetre scale, and protractor. The skin and subcutaneous tissues are infiltrated with the novocain solution, and the platinum needle is then introduced at the proper angle, that is, at an angle of 45° or a little less to the transverse line and of 35° to the cutaneous surface. The distance to which the needle must be advanced will vary according to whether the individual be lean or stout. On the average the distance to the nerve in the upper thoracic is 3 cms., and in the lower thoracic or lumbar regions 4 cms. When the needle comes in contact with the nerve the patient will at first experience a sharp pain, referred to the terminal distribution of the nerve, soon allayed by the injection of a few drops of the solution. At each injection 5 to 10 c.c. are used, according to whether the injection be made directly into the nerve or about it. In the average case, where fewer laminæ are to be removed, it will be necessary to inject four right and four left spinal nerves.

As with regional anaesthesia elsewhere, owing to anatomical variations and other considerations, the degree of anaesthesia may not be complete enough in all cases to conduct the operation throughout without pain. Under such circumstances supplemental injections of novocain solution may be made,

especially in the removal of the spinous processes and laminae, when the needle is introduced directly into the periosteum. Or if need be, at this stage, for a few moments one may resort to nitrous-oxide anaesthesia.

After the spinal canal has been opened, subsequent manipulations may require recourse to other methods of anaesthesia according to the object to be attained. For example, in the removal of tumours attached to the roots, or in division of the posterior roots, some method must be adopted of controlling or inhibiting pain, and for this purpose may be used the application of *Stovaine* on a pledget of cotton.

Regional anaesthesia is appropriate chiefly for operations in the thoracic region. When called upon to perform a laminectomy in the lumbar region, spinal anaesthesia is the method of choice, because it is equally, if not more, effective, and the technique less complicated.

Other important matters of technique are: An ample exposure, implying the removal in the first instance of an adequate number of laminae; *x*-ray identification of at least one lamina before the operation, so that the opening corresponds precisely to the location of the lesion; coffer-damming with cotton the spaces on either side of the dural flaps, to prevent drops of blood gaining access to the dural sac—a potential factor in the formation of post-operative adhesions; the gentlest manipulation of the cord or roots, and the *stovaine* block as prophylactic against shock; minute closure of the dural incision with fine needles and silk, to prevent the escape of cerebrospinal fluid; careful juxtaposition of each layer—muscle, muscle sheath, and intervertebral aponeurosis, together with superficial fascia—to ensure maintenance of function and the avoidance of disability after the removal of spines and laminae. Observing these essential features, the performance of a laminectomy may be resorted to with anticipation of the patient's recovery in all but exceptional instances.

REFERENCES.—¹*Ann. Surg.* 1918, i, 513; ²*Ibid.* 63; ³*Amer. Jour. Med. Sci.* 1918, i, 483; ⁴*Ann. Surg.* 1918, ii, 12.

SPLEEN, SURGERY OF.

E. Wyllys Andrews, A.M., M.D.

William J. Mayo¹ discusses the relation of the spleen to various clinical phenomena. Splenectomy has been performed without serious consequences after trauma. In all of those in which it is performed for disease we find the organ enlarged. The relation of the spleen to the liver is of great clinical interest. We know that the liver destroys bacteria and protozoa, and has a most important relation to metabolism. It is less certain what function the spleen has in reference to infections; but probably this is considerable, and like the tonsils it may produce immunizing agents, allowing early introduction of a few bacteria which act as a cure rather than as a cause of disease. Splenic enlargement from chronic sepsis is not uncommon. Focal infections may act as the primary source, as in septic endocarditis. In eight cases Mayo removed very large spleens for what appeared to be pure sepsis, infarcts, etc. Occasionally, tuberculosis is primary in the spleen. Spirochaetic hibernation is not uncommon in the organ. It is unknown whether all the blood of the body must pass through the spleen, or whether there is an affinity of this organ for certain elements of the blood. Mayo removed the spleen fifty times for pernicious anaemia. There was temporary improvement in every case, but no cure. Leukæmia has not been considered curable by operation, as 95 per cent would die after splenectomy, yet improvement takes place after medication, as benzol, *x* rays, etc. Mayo's first case of splenectomy for myelogenous leukæmia had a 300,000 leucocytosis for three years; *x* rays finally lost their effect; in ten days after splenectomy the count dropped to 50,000.

He also did nineteen splenectomies for hæmolytic jaundice, with uniformly good results.

Baccini,² of Brooklyn, has collected a large number of records of operations, the statistics of which seem to show a mortality of about 6 per cent for splenectomy. In summary, this would appear to be indicated in: (1) Banti's disease, first stages particularly; (2) Griesinger disease; (3) Minkowski-Chauffard and Hayem-Widal jaundice; (4) Primary splenic tuberculosis; (5) Hereditary splenic syphilis (after medication fails); (6) Chronic malaria attended with splenomegaly. Splenectomy is of questionable benefit in: (7) Splenic infantile anæmia; (8) Pernicious splenomegalic anæmia; (9) Gaucher's disease. It is contra-indicated in: (10) Splenomegaly incident to leukæmia and pseudoleukæmia; (11) Splenomegaly of kala-azar.

Capt. R. Jamieson³ reports observations on 6 cases of ruptured spleen observed in a casualty clearing station in Macedonia. All these patients had the common symptoms of violent abdominal pain and collapse. Recovery occurred usually in an hour. The gravity of the case is almost directly proportionate to the lapse of time. His shortest time between injury and operation was 2½ hours, and the longest 24 hours. A vertical incision 3 in. in length to the left of the middle line was made in all cases. If necessary, the rectus can be divided at one of its bands, giving a large amount of room. The hand can be passed immediately backward and the spleen drawn forward. With this grasped, the pedicle can also be compressed so that hæmorrhage will cease immediately. As the hilum contains the branching vessels in some cases, a double or triple ligature is often required. The whole operation can be very rapidly performed. After removing the extravasated blood the abdomen can be quickly closed. No ill effects were noticed in any of these patients from the loss of the organ. An average of these cases showed 22,000 leucocytes forty days after operation. All the cases recovered. Included in this report are also ruptures of other organs: Kidney 2, both recovered; duodenum 1, recovered; small intestine 1, died; omentum 3, 2 recovered, 1 died.

Fiolle⁴ discusses the injuries of the spleen in war and their surgical treatment. Penetrating wounds do not always require splenectomy, since if the bleeding can be checked, recovery is possible. When the damage to the spleen has been extensive it is safer to remove the organ. In a number of Fiolle's cases the penetration was abdomino-thoracic, both pleura and peritoneum being opened. Many of these cases did well. The treatment in general should be operative in all cases, but not necessarily a splenectomy. The best incision is a vertical one with a left rectangular cut through the rectus; but an oblique incision in the axillary line, as recommended by Duval, and a transverse lumbar incision, have also been employed. The last incision is especially valuable as giving very free access to the pedicle just anterior to the left kidney.

REFERENCES.—¹*Med. Rec.* 1917, Oct. 27; ²*Ann. Surg.* 1918, May; ³*Brit. Med. Jour.* 1916, Sept. 14; ⁴*Rev. de Chir.* 1917, May-June, 679.

SPLENIC ANÆMIA. (See BANTI'S DISEASE.)

SPOROTRICHOSIS.

E. Graham Little, M.D., F.R.C.P.

Eisenstaedt¹ describes an interesting case of this disease simulating tuberculosis cutis in a young man otherwise in robust health, who had suffered from the skin lesions for about twenty-seven months. These had begun as nodules, which ulcerated later, causing little disturbance of health. The distribution did not follow lymph channels, nor were the glands enlarged. The right arm, and later the right leg and thigh, were the sites affected.

Cultures were made from the pus, and grew the typical organism. Sodium iodide in increasing doses was at first tried and ill-borne, so that intramuscular injections of 25 per cent Iodine solution were substituted. Local dressings of Cresol, or of 1-5000 Mercuric Chloride seemed to improve the aspect of the lesions.

Moore and Davis² report a case of sporotrichosis in a boy, age 13, following upon the bite of a field mouse. The mouse was not examined, so that the causation was not actually proved, but cultures from the boy showed sporotrichum of Schenk, and inoculations of this organism into rats produced tumours from which the sporotrichum was again recovered. The authors establish the interesting fact that from agglutination tests conducted in this case with five different strains of sporotrichum, including a Parisian variety, the conclusion was reached that no differentiation was possible.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1918, ii, 726; ²*Jour. Infect. Dis.* 1918, Sept., 252.

SPRUE.

Sir Leonard Rogers, M.D., F.R.C.P.

L. Rogers¹ records four years' further experience of Autogenous Oral Streptococcus Vaccines in the treatment of seventeen cases of sprue. Cultures were made from the raw edge of the tongue, or even from the tonsils, and doses of 50 million to begin with, gradually increased to 200 million, given at weekly intervals for several months. Brief notes of the cases are given, and the results summarized in a table. Cases were only counted as cured if the patients remained well for a year and upwards after cessation of the treatment. Of 13 cases under observation treated long enough to comply with this severe test, 7 were cured, 4 greatly improved, 1 not improved, while 1 died of pernicious anæmia.

Lucius Nicholls² records an interesting study of the streptococci found in the mouth lesions, and furnishes the first confirmation of the value of Rogers's treatment of the disease by autogenous oral streptococcal vaccines. He found the organisms to belong to the *Streptococcus viridans* group, not having a capsule, being nonhæmolytic, not lysed by ox bile, and not producing acid from mannite in Hiss's serum-water. Serological tests gave irregular results, but the serum of patients gave the complement-fixation test, although normal serum had practically no such power. He has treated nine cases with vaccines, but only three have been long enough under observation to report on; all three were rapidly cured, and the results in the others are so promising that he knows of no other disease which responds so readily to vaccine treatment. He suggests work on similar lines in pellagra and scurvy.

REFERENCES.—¹*Ind. Med. Gaz.* 1918, April, 121; ²*Ibid.* Nov., 409.

STOMACH, SURGERY OF.

E. Wyllys Andrews, A.M., M.D.

William Doolin¹ reports cases of acute dilatation of the stomach, and discusses its surgical importance. This condition leads to fatal results if not promptly relieved. It may arise after any abdominal operation or in the course of a long illness. Gastric distention is the primary condition. Duodenal obstruction supervenes in 25 per cent of cases. Gastric atony is necessary for its occurrence. The primary distending cause is gas, due to air-swallowing during narcosis. The writer does not mention acute flexion of the duodenum and the ligament of Treitz as important. Early recognition of this condition calls for prompt use of the stomach tube, operation not being indicated as a rule.

Gastric and duodenal ulcer is discussed in a large number of articles in medical journals all over the world. Balfour,² of the Mayo clinic, is again advising the Actual Cautey in the treatment of ulcer, as suggested by Leube

and others twenty years ago. He employs the hot point in place of the knife for excising the ulcer, and reports good healing and aseptic repair.

The same writer speaks in favour of anti-colic gastrojejunostomy and partial gastrectomy in carcinoma of the pylorus. In this operation the cautery is also used to divide the viscera, and the cut-off stomach is implanted laterally into the convex border of the jejunum.

Lewinsohn³ reports cases in which stenosis of the stoma followed resection of the stomach for benign tumours or carcinoma of the stomach. The cause is not quite evident, though in one case the Murphy button used had been too small; but the result was a recurrence of symptoms like those of carcinoma.

Rovsing⁴ reports 133 cases of duodenal ulcer, 118 of which were operated on. His preference is for excision of the ulcer with pyloroplastic repair, carrying the incision well down into the duodenum and upward into the stomach. The mortality was 12, and only 10 cases showed recurrence.

George Woolsey,⁵ of New York, shows that many recurrences follow the ordinary operation for gastric ulcer. One cause of these failures is the occurrence of peptic ulcer in the jejunum itself. His experience is that excision of the ulcer without gastro-enterostomy does not cure the patient. Another cause of failure is improper selection of cases. After recounting numerous recurrences that came in his hospital experience, Woolsey concludes that these occasional failures are due to: (1) Improper technique; (2) Improper selection of cases; (3) Improper after-care and diet; (4) Failure to remove other causes.

Rodman⁶ presents a very interesting *résumé* of the results of gastric excision of the ulcer-bearing area, first advocated by his father in 1900. In a large series of cases the results have seemed to confirm the claims of the elder Rodman, that excision of a diseased pylorus, even when not malignant, offered a more radical means of cure than gastrojejunostomy.

Devine⁷ believes that gastro-enterostomy only for ulcers of the lesser curvature results in failure, wide resection being preferable. He also believes in pyloric exclusion by fascial grafts, but insists that no fixed rule should be adopted for all varieties of the disease.

McArthur,⁸ of Chicago, emphasizes again the value of his method of introducing fluid through a biliary fistula to combat shock, anuria, vicious circle, and vomiting. Through the tube entering the gall-bladder the latter can be washed out and salt solution or nutrient fluid introduced.

Troell,⁹ of Stockholm, discusses the surgical aspect of gastric ulcer and the results of surgical intervention. It was his experience that operation often proved negative or harmful in cases showing no pathology under the *x* ray. In other words, mechanical remedies imply mechanical defects. With careful *x*-ray examination and laboratory tests, cases can be so selected as to bring about a large percentage of cures from surgical interference. (*See also X-Ray diagnosis, p. 30.*)

REFERENCES.—¹*Brit. Jour. Surg.* 1918, July; ²*Surg. Gyn. and Obst.* 1917, Nov.; ³*Ibid.*; ⁴*Hosp. Tid.* 1917, ix, 621; ⁵*Surg. Gyn. and Obst.* 1917, Nov.; ⁶*Boston Med. and Surg. Jour.* 1917, June 14; ⁷*Med. Jour. of Australia*, 1917, Aug. 4; ⁸*Surg. Clin. of Chicago*, 1917, 197; ⁹*Swedish Med. Soc.* 1918, April 18.

STOMACH, ULCER OF.

Robert Hutchison, M.D., F.R.C.P.

Regarding the much disputed question of the relation of gastric ulcer to cancer, Ewing,¹ from a study of material derived both from operation and from autopsies, concludes that the conversion of a peptic ulcer into a cancer is rather infrequent, and probably does not exceed the incidence of 5 per cent originally established. This proportion would be much smaller if only those cases were included in which the evidence is demonstrative—viz., a long history

of gastric ulcer, the limitation of the tumour to isolated foci or one portion only of the ulcer, and freedom of the base from infiltration.

The use of x rays in the diagnosis of peptic ulcer has been studied on a considerable scale by Baetjer and Friedenwald.² They believe themselves justified in drawing the following conclusions:—

1. The x ray offers most valuable assistance to the diagnosis of peptic ulcer, and although this method is not yet sufficiently well developed to be relied upon alone without entering into the clinical aspects of the disease, it is of the greatest diagnostic help in obscure cases. Positive x -ray findings are noted in about 84 per cent of cases of peptic ulcers, and in 79 per cent of cases operated upon.

2. In duodenal ulcer there is excessive hypermotility of the stomach, with rapid evacuation of the contents, so that the greater portion is extruded within the first half-hour; there is hypermotility of the duodenum, with formation, usually, of a deformity which remains fixed in all of the examinations.

3. The diagnosis of gastric ulcer is dependent upon two conditions, namely, the functioning of the stomach, and the finding of the filling defect. It is only when the filling defect is situated along the anterior surface of the stomach and along the anterior surface of the lesser and greater curvatures that it can be demonstrated. On the other hand, it matters not what the situation of the ulcer is, the functions of the stomach are materially affected. We have in this condition an excessive irritation from the ulcer, with consequent hypermotility and a spastic condition of the pylorus, so that for the time being there is practically no expulsion of bismuth. It is only when the spasticity relaxes that a portion of the bismuth is expelled. In gastric ulcer, wherever its situation, we can always look for a certain amount of retention of contents. There is always a more or less marked hour-glass formation. According to our observations the functional signs are often as important as the presence of the filling defect in arriving at definite conclusions, inasmuch as in 8 per cent of our cases, although there were no defects found, the functional changes pointed definitely to ulcer.

4. The greatest difficulties arise in the diagnosis of complicated cases; that is, when adhesions are present. These so frequently mask the usual findings that it is often impossible to determine whether there is really an ulcer of the stomach at hand or a lesion of some other organ. When the ulcer is situated at or near the pylorus, signs of partial obstruction frequently aid in establishing the diagnosis.

5. The x ray affords an almost absolute means of differentiating between gastric and duodenal ulcer.

6. By means of the x -ray examination we can generally rule out the presence of ulcer.

7. We can approximately determine the degree of healing as well as recurrence of an ulcer which cannot be as certainly determined in any other way.

8. One can obtain sufficient evidence as to the extent and induration of the ulcer and degree of obstruction to guide us, in a measure, as to the necessity of surgical intervention.

Hall³ discusses impartially the relative advantages and disadvantages of medical and of surgical treatment respectively in peptic ulcer. The chief advantage of surgical treatment he considers to be that it enables us to know precisely what we are treating—an important point in a disease the diagnosis of which is often uncertain. Operation also enables one often to detect and deal with incipient cancer and to remove complications such as a chronically inflamed appendix, gall-stones, etc. The chief disadvantage of medical treatment is the likelihood of relapse—‘probably more cases relapse than

remain well'—if they return to the usual habits of life. He concludes that we should weigh carefully the matter of the certainty of the diagnosis, the probability of relief by medical treatment, or of complete cure in favourable cases, the chances of relapse, the favourable or unfavourable physical condition of the patient, the danger of cancer, the possibility of relieving some complicating trouble by operation, the favourable or unfavourable occupation and surroundings of the patient, and, to some extent, the patient's desires. There should be no bias in the medical mind in favour of one line of treatment or another, excepting as it is based upon all of the above considerations.

Deaver,¹ in dealing with the same subject, leans strongly to the surgical side. He considers it doubtful whether a true peptic ulcer ever heals under medical treatment, whilst surgery cures from 75 to 90 per cent, and he urges his readers, 'with courage, confidence, and faith,' to advise radical treatment as against dawdling. (See also GASTRO-ENTEROSTOMY.)

REFERENCES.—¹*Ann. Surg.* 1918, June, 715; ²*Johns Hop. Hosp. Bull.* 1918, Aug., 177; ³*Med. Rec.* 1917, ii, 353; ⁴*Ibid.* 1918, i, 1015.

STREPTOCOCCUS INFECTIONS. (See also MEASLES; SKIN, STREPTOCOCCIC INFECTIONS OF.) J. D. Rolleston, M.D.

Respiratory infections, particularly of the streptococcus group, were remarkably frequent during 1917-18 in the U.S. Army camps, whereas gastro-intestinal infections such as typhoid and dysentery, owing to the general use of inoculation and the protection of drinking water from contamination, have been exceptional. J. A. Capps¹ regards the source of infection as infected milk, cream, and ice-cream, and recommends that all milk and cream products should be pasteurized under direct supervision of the camp authorities.

W. G. MacCallum² states that the *Streptococcus haemolyticus*, with or without various predisposing diseases, e.g., measles, gives rise to extensive and fatal epidemics of a peculiar bronchopneumonia which, in most cases, affects the framework of the lung and bronchial walls. It is often associated with a diffuse or patchy lobular pneumonia in which the streptococcus appears finely scattered in the alveolar exudate. Such areas may be confluent and resemble a lobar pneumonia. Ulcerative laryngitis, causing deep destruction of the vocal cords and epiglottis, occurs in the acuter cases, especially those following measles. Empyema is an extremely frequent complication, but other complications are not frequent. G. H. Lathrope³ records an outbreak which was peculiar in two points: (1) The dominant organism was the *Streptococcus viridans* and not the *Streptococcus haemolyticus*, as appeared elsewhere; (2) Its chief expression was in the form of an unusually severe involvement of the middle-ear and mastoid tissues.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1918, ii, 448; ²*Ibid.* 704; ³*Ibid.* 451.

SURGICAL SHOCK. (See SHOCK, SURGICAL.)

SYCOSIS. (See SKIN, STAPHYLOCOCCAL INFECTIONS OF.)

SYPHILIS. (See also SKIN AND VENEREAL DISEASE COUNTERFEIT.)

C. F. Marshall, M.D., F.R.C.S.

DIAGNOSIS.—The Medical Research Committee¹ deals with methods of detection of spirochaetes. In the first place, the name *Spirochaeta pallidum*, originally suggested by Vuillemin in 1905, is adopted instead of *Spirochaeta pallida*, in accordance with evidence supplied by Dobell. This authority states that the micro-organism of syphilis is now known to belong to the bacteria and not to the protozoa. Examination by dark-ground illumination is regarded as the ideal method, and a detailed description of its technique

is given by J. E. Barnard. The Indian ink and Congo-red methods of examination are not recommended because they are liable to cause distortion and do not show the characteristic movements. For the staining of films, Giemsa's original method is considered the best; of the various silver-nitrate methods, Tribondeau's modification of Fontana's method. In this the film, after fixing with formol acetic acid, is mordanted with a solution containing tannic acid, washed in water, and stained with an ammoniacal solution of silver nitrate. The disadvantages of staining compared with dark-ground illumination are the distortion produced by drying, the absence of characteristic movements, and the fact that the *S. pallidum* has little affinity for staining reagents, and so may not be detected when present. With regard to *chancroid*, the Committee find no definite evidence that soft chancre is a specific disease caused by a single micro-organism, and recommend that a diagnosis of soft chancre should only be made after syphilis has been excluded by observations extending over twelve weeks. The same recommendation applies to balanitis.

The Wassermann Test.—The Medical Research Committee² draw attention to the importance of standardization. At present the value of the diagnosis provided by any given laboratory cannot be estimated, and the consequent uncertainties have rendered valueless the results of many observers. The Committee, however, admit that in the present state of our knowledge it is impossible to fix upon an optimum technique, but they recommend that in tests made for official returns only those methods should be accepted which conform to the original Wassermann test as defined by the Sub-committee of the Pathological Section of the Royal Society of Medicine on Dec. 21, 1914. This definition is as follows: “(1) The ingredients of the test (red corpuscles, ‘antigen,’ hæmolytic amboceptor, complement) are derived from different sources; (2) The serum to be tested is inactivated before use. An independent hæmolytic system is employed, consisting of a suspension of red corpuscles, an inactivated hæmolytic serum, and a fresh normal serum containing complement. The hæmolytic value of the antiserum and complement are determined by a separate preliminary experiment.” Also, since the test is a quantitative reaction, the titre of the reagents ought, within practicable limits, to be accurately known. The Research Committee give details of four methods which they consider fulfil the above conditions: (1) Harrison's method; (2) Filder and McIntosh's; (3) Browning's method; and (4) One which combines the best features of the other three. In Browning's method two ‘antigens’ are used: alcoholic extract of ox-liver with lecithin, and the same reinforced with cholesterin; in all the others, alcoholic extract of heart reinforced with cholesterin. The Committee further recommend that standardized antigens and amboceptor should be prepared and issued with full particulars of their titres; that when the clinical history and symptoms are doubtful, a diagnosis of syphilis should not be made on a single positive Wassermann reaction; that reports should be accepted only from pathologists with adequate experience of the test; and that the so-called ‘short-cut’ methods should only be supplementary to the official tests performed by one of the above four methods.

Noguchi,³ on the other hand, is in favour of a ‘short-cut’ method which he says gives results in accord with those obtained by the original Wassermann. This consists in using the complement present in fresh human serum in a hæmolytic system which comprises anti-human amboceptor and human corpuscles. The antigen used is a 10 per cent saline emulsion of the acetone-insoluble fraction of tissue lipoids dissolved in pure methyl alcohol in the ratio of 3 per cent. He states that the results agree with those obtained by his former method (guinea-pig complement, anti-human hæmolytic amboceptor, and

human blood-corpuscles), and also with the usual anti-sheep hæmolytic systems.

H. W. Bayly⁴ discusses the use and abuse of the Wassermann reaction. He still regards the reaction as one of the most valuable evidences of syphilitic infection, but considers that the diagnosis cannot be based with certainty on this symptom alone, even if the reaction is strongly positive. Illustrative cases supporting this view are given. He concludes that many non-syphilitic cases are being diagnosed and treated as syphilitic owing to a confidence in the test depending too much on the opinion of a few experts and too little on clinical experience and the unbiased evidence of logical deduction. He remarks that there is a danger that this valuable test may become discredited and neglected by those who distrust it because some ardent enthusiasts claim for it an infallibility which it does not possess. "For some years the precise value of a positive Wassermann will remain largely a matter of individual opinion."

Symmers, Darlington, and Bittman⁵ have compared the results of the Wassermann reaction during life with the post-mortem findings in 331 cases examined during the last seven years at the Bellevue Hospital, New York. At first cholesterin-fortified antigen was used exclusively; latterly both cholesterinized and non-cholesterinized antigens. The authors report: (1) That the reaction in the living patient gave a negative result in from 31 to 56 per cent (depending on the antigen employed) of cases in which the signs of syphilis were found at necropsy; (2) That the reaction was positive in at least 30 per cent of cases in which signs of syphilis were absent at necropsy. Although they were unable to subject every tissue to special methods of staining to demonstrate the *Spirochaeta pallida*, they do not think that their results are much impaired by this, for Symmers obtained negative results in another comprehensive series of known syphilitic lesions stained by the Levaditi method. They quote a case of early acute generalized syphilis, fatal from acute nephritis, in which examination for spirochaetes gave negative results in all the lesions. They also point out that in cases of aortitis, orchitis, etc., minute tissue fibrils may be mistaken for spirochaetes when stained by the silver method.

Larkin, Levy, and Fordyce,⁶ criticizing the above results, state that microscopic changes characteristic of syphilis may be found without any naked-eye evidence. They also point out that in Symmers's, etc., report there is no mention of examination of the cerebrospinal fluid; nor of the lymphatic glands, bone-marrow, and spleen, which may harbour spirochaetes; nor any mention of the treatment administered, which influences the reaction. They also question the technique employed. These authors conclude that the Wassermann test, as a means of corroborating syphilitic infection, is dependable in at least 90 per cent of cases, as shown in a series of positive reactions observed by them in which 90 per cent could be accounted for by syphilitic aortitis alone.

Sterne⁷ sums up his conclusions regarding the Wassermann reaction as follows:—

1. A positive reaction, in temperate climates, in the blood, and more especially in the spinal fluid, signifies syphilis. The exceptions differ so much clinically that there should be no confusion.

2. A negative serum reaction, and even a negative spinal-fluid reaction, do not signify the absence of syphilis. In this connection he mentions the researches of Warthin, who found spirochaetes, post mortem, in practically every organ and tissue in cases which had repeatedly given negative reactions during life. Sterne suggests that spirochaetes, morphologically intact, may remain indefinitely fixed in the tissues without causing symptoms. Warthin's researches show the necessity of a more reliable test than the Wassermann.

3. Laboratory tests are merely clinical signs which may be present or absent like other symptoms, and can only be correctly interpreted by carefully weighing their results with the clinical evidence. The laboratory findings should fit into the clinical syndrome, and not vice versa.

Stokes and O'Leary⁸ have investigated the value of the *provocative Wassermann test* in the diagnosis of syphilis from a study of 103 cases, and conclude that it is of little value.

The Gum-mastic Test.—Several observers have investigated the value of this test (introduced by Emmanuel in 1915 as a substitute for Lange's colloidal-gold test), with contradictory results. The test consists in adding various dilutions of the cerebrospinal fluid to be tested to an emulsion of gum-mastic in absolute alcohol and distilled water mixed with a 1.25 solution of sodium chloride. In a modification of the test by Cutting,⁹ 1 c.c. of a 0.5 per cent solution of potassium carbonate is added to 99 c.c. of the salt solution. The result of the test depends on the amount of precipitation produced. Normal cerebrospinal fluid causes no change in the emulsion. C. E. Smith and Lowrey¹⁰ have applied the test to 268 cases in the Psychopathic Hospital, Boston, including 74 cases of syphilis of the nervous system. The results were compared with those obtained by the Wassermann reaction in blood and cerebrospinal fluid, and the colloidal-gold test, cell count, and globulin test in the latter. The results, on the whole, corresponded. The authors conclude that the test is useful in the examination of spinal fluids, but does not differentiate between syphilis and acute meningitis. E. R. Smith¹¹ concludes that the results of the mastic test are the same as those of the gold test. It is interesting to note that he found both tests positive in three cases of multiple sclerosis, the Wassermann being negative in blood and cerebrospinal fluid. A more instructive case was one with a history of syphilis and the presence of Argyll Robertson pupils, in which both these tests were positive while all other tests for the spinal fluid were negative; the blood, however, gave a positive Wassermann. The author, therefore, thinks it likely that the gold and mastic tests may be the most sensitive for syphilis of the central nervous system. Immerman,¹² on the other hand, comes to the conclusion that the degree of precipitation in the gum-mastic reaction depends entirely upon the quantity of globulin present in the spinal fluid tested, that it is of little value, and that whatever information it may give can be obtained by simpler means.

Nitric-acid Test.—Another precipitation test is that of Bruck, which depends on the fact that the nitric-acid precipitate in syphilitic serum dissolves more slowly after neutralization with alkalis than that in normal serum, and endeavours to determine the amount of distilled water which will dissolve the normal precipitate but not that in syphilitic serum. Bruck reported that in about 200 syphilitic serums the results agreed with the Wassermann reaction, and that in about 200 non-syphilitic cases the results were all negative except in a few febrile ones. These results, however, are not corroborated by Stillians,¹³ who, after examining 209 cases, concludes that the nitric-acid, like all other precipitation tests, is unreliable.

Colloidal-gold Test.—Black, Rosenberg, and McBride¹⁴ report the results of 169 examinations of the cerebrospinal fluid, in 59 cases of syphilis of the central nervous system, by this method. The technique of preparation of the gold solution used was a simplification of that devised by Miller and others at the Johns Hopkins Hospital. For the details of this the original article must be consulted. Their conclusions are that:—

1. In the diagnosis of cerebrospinal syphilis, the test is more delicate than the Wassermann and more reliable than pleocytosis or estimation of globulin.
2. It is the best guide for prognosis during treatment.

3. There is no provocative gold test.

4. The presence of red blood-cells or plasma in the spinal fluid often vitiates the result.

Mercuric-chloride Test.—Mann and Van Saun¹⁵ have compared this test for syphilitic serum, introduced by A. Gordon, with the Wassermann reaction in 248 cases. They found that the two failed to correspond in more than 50 per cent, and conclude that like most other chemical tests it is not specific for syphilis and only shows a pathological change. The test consists in the formation of a cloudy precipitate with pathological, but not with normal, serum.

TREATMENT.—In a series of articles,¹⁶ prepared under the direction of the Surg.-General of the U.S.A. Army, the following treatment is recommended. **Salvarsan** should be combined with **Mercury**, and reliance should not be placed on salvarsan alone. A safe and vigorous course of salvarsan between extremes is advised. Such a course is a dose of 0.4 to 0.6 grm. at five-day intervals for three doses; after that at intervals of a week for five more doses, making a total of eight doses of salvarsan in about six weeks. It is possible that in cases seen before the Wassermann becomes positive, one such course combined with mercury may be a cure; but this is not safe to assume, and in all cases the course should be repeated after an interval of six to eight weeks. In cases first seen after the Wassermann has become positive, a third similar course is recommended after an interval of eight weeks, and further courses if evidence of syphilis remains. The term 'salvarsan' is taken to include the products made in the States and other countries, which experience has shown to be as effective as the original. **Neosalvarsan** may also be used in 50 per cent larger doses. The administration recommended is intravenous, no mention of intramuscular injections being made. Salvarsan is given in dilute solution of 1 cgm. to 25 c.c. of hot sterile distilled water by the gravity apparatus; but apparatus by which saline solution is allowed to flow in before salvarsan is considered non-essential and complicated. **Neosalvarsan** is given by injection in concentrated solution in 10 c.c. of cold sterile distilled water. **Mercury** should be given at the same time or within a few days after the first dose of salvarsan, either by injection or inunction. If *inunctions* are given, they must be properly carried out: patients cannot be trusted to perform it on themselves, but they can do it for each other by one man rubbing the back of the next in front of him. From 4 to 8 grms. of mercurial ointment may be used daily for twenty to thirty minutes, after previous cleansing of the skin with alcohol and soap and water. A course of inunctions consists of forty-five, in series of six weekly. For *injections* the insoluble salts are preferred—grey oil, calomel, or salicylate. A good formula for **Grey Oil** is: mercury 20 grms., chlorbutol 2 grms., anhydrous lanolin 30 c.c., liquid petrolatum to 100 c.c. **Salicylate** and **Calomel** may be given in the form of 20 grms. in 100 c.c. of sterile olive oil or liquid petrolatum. The three preparations thus have the same strength and the same dose, the average dose being 5 min. (0.06 grm. or 1 gr.) weekly; this may be increased to double or more with caution. The curative effect of soluble salts of mercury is perhaps less, but they are free from the dangers of the cumulative effect of the insoluble preparations, and they are useful when rapid action is required. The most useful are the perchloride and the succinimide, in the form of 1 per cent solutions with 1 per cent sodium chloride. The average dose is 25 min. (0.015 grm. or $\frac{1}{4}$ gr.). As regards progress, a patient is considered free from the necessity of further observation and treatment who has remained free from all evidence of syphilis for a year, after continuous observation and Wassermann tests at intervals of two months. As regards *spinal puncture*, and *provocative injections* of

salvarsan with subsequent Wassermann tests, in every case before discharge, it is considered that there is sufficient difference of opinion to relegate these measures to special cases. Tertiary syphilis is treated with **Mercury and Iodide of Potassium**. With regard to *salvarsan reactions*, the majority are rarely of consequence; but vomiting indicates caution, and anaphylactic phenomena, such as oedema and syncope, require immediate treatment by intramuscular injection of 5 to 10 min. of a 1-1000 solution of epinephrin (adrenalin). In patients subject to such reactions this may be administered before the salvarsan. Exfoliative dermatitis with nephritis is an indication for conservatism in the further use of the drug. A trace of albumin and a few casts in the next morning's urine are not uncommon and are of little moment, unless the albumin is considerable and the casts are numerous. The occasional ocular, auditory, and other nerve symptoms (neuro-recurrences) are considered due to syphilitic processes, and not manifestations of salvarsan intolerance.

Chancroid.—It is wisely pointed out that any chancroid may be infected with the *Spirochaeta pallida*, and is therefore a potential cause of syphilis requiring observation for two months. The treatment recommended is thorough cauterization by the thermocautery, or by pure phenol followed by nitric acid. By this means bubo may be prevented. Contra-indications for this treatment are extensive area of the lesion, inflammatory reaction and oedema, inguinal adenitis, and chancroid at the meatus. Such cases require soaking in hot water, **Irrigation** with warm boric acid, permanganate or mercuric chloride solutions, **Iodoform** and **Moist Dressings**. For suppurating bubo, injection of 10 per cent **Iodoform Emulsion** through a small incision is advised. A free incision and packing may be required, but should be avoided if possible owing to the long period of healing. Treatment of bubo by injection of a 10 to 15 per cent **Iodoform Vaseline** is also recommended by Dubreuilh and Mallein.¹⁷

A. S. Clark and R. S. Nelson¹⁸ describe the course of treatment carried out at the New York Post-graduate Clinic. Intravenous injections (six to ten) of **Salvarsan** at intervals of five to seven days in doses from $2\frac{1}{2}$ to 5 mgrms., immediately followed by intramuscular injections of **Salicylate of Mercury** in doses from 1 to 3 or 4 gr. at weekly intervals for twelve to fifteen weeks. The formula for salicylate of mercury used is: mercury salicylate 5 grms., anhydrous lanolin $1\frac{1}{2}$ grms., olive oil to 15 grms. In secondary syphilis two of the above courses are given; in tertiary and latent syphilis "as many courses as are indicated by the Wassermann reaction," but not less than two nor more than four. The soluble **Cyanide of Mercury** given daily or every other day may be used instead of salicylate. Doses of over 4 or 5 mgrms. of salvarsan are not well tolerated, and sometimes there is absolute intolerance to the drug. Large doses of **Iodide of Potassium**, up to 45 or 60 gr., are given in tertiary syphilis, along with the mercury. The authors consider that salvarsan is contra-indicated in florid secondary syphilis till the rash has almost disappeared, in aortic aneurysm, severe arteriosclerosis, active nephritis, diabetes, and severe wasting diseases. Syphilis of the central nervous system is treated by *intra-spinal injections* by the combined Swift-Ellis and Ogilvie methods. The patient is given an intravenous injection of **Salvarsan**, his blood is withdrawn and centrifuged, and salvarsan added to the serum (Ogilvie method). The serum is inactivated at 57° C. for forty minutes. A course of ten injections, in doses from $\frac{1}{2}$ to $\frac{1}{4}$ mgrm., given at intervals of two or three weeks, is said to be effective in the early stages of central nervous syphilis.

—E. M. Watson¹⁹ reports good results from the treatment of sixteen cases of tabes and cerebrospinal syphilis with intraspinal injections of Byrnes'

Mercurialized Serum. The bladder symptoms were much improved, pains diminished or disappeared, and in some cases of tabes ataxia improved. At the same time the pathological changes in the cerebrospinal fluid diminished. The serum used was the commercial product made up with $\frac{3}{10}$ gr. of mercuric chloride dissolved in horse serum and made up to 30 c.c. with physiological salt solution. The cases received an average of four weekly injections. The spinal fluid was allowed to flow till the pressure was reduced to 20 mm. of water, before running in the 30 c.c. of mercurialized serum. In cases with a positive Wassermann in the blood, four weekly intravenous injections of **Salvarsan**, 0.4 to 0.6 grm., were given concurrently.

Loeper and Bergeron²⁰ report on 166 cases of syphilis in all stages treated with **Colloidal Mercury** and **Sulphur**. These were made up in ampoules containing 0.001 or 0.0003 grm. of colloidal sulphur and 0.001 grm. of colloidal mercury, diluted to 12 c.c. and injected intravenously or intramuscularly. Intravenous injections were more rapid, and caused some febrile reaction. The results were good in 80 per cent of the cases, and the Wassermann reaction was rendered negative in 86 out of 120 cases. The treatment was especially effective in rebellious lesions of the buccal cavity, in syphilitic arthritis, arteritis, and nephritis, in keratitis and iritis, and in cerebral syphilis and aortitis. Several had failed to improve under mercury and arsenobenzol.

Spittel²¹ reports his results with intravenous injections of **Arsenious** and **Mercuric Iodide** in syphilis and yaws. After a three-years' experience with over 5000 injections, he claims that the therapeutic effects are little short of those obtained by salvarsan as regards rapidity, and superior as regards the absorption of infiltrations, in all stages of syphilis. Moreover, these drugs are much cheaper and easier to obtain. The solution he uses consists of mercuric iodide 50 gr., arsenious acid 40 gr., sodium iodide (1 per cent solution) 1 oz., distilled water 40 oz. The solution must be rendered slightly alkaline with sodium hydrate. Dose, 8 to 15 c.c. diluted to 20 c.c. with sterile water, given in several courses of four to six injections at weekly intervals of a month. The reaction is generally slight, but there may be vomiting, fever, and burning sensations a few hours after injection, and later on stomatitis, coryza, and diarrhœa. Herxheimer's reaction is generally pronounced. Spittel concludes that this is the best method of treatment for syphilis and yaws.

Salvarsan and Tabes.—Lepine²² remarks that during the last twenty years tabes seems to have diminished both in frequency and severity, and that this change in evolution coincides with intensive treatment by mercurial injections. During the last three years, on the contrary, this affection appears to have become more frequent and more severe, and to develop at an earlier date after the original infection, and this change coincides with treatment with salvarsan. Many such cases have been treated with salvarsan since the chancre. Others, thus treated since the first appearance of tabetic signs, have been aggravated. It would therefore appear that the early treatment of tabes by salvarsan does not prevent the development of tabes and general paralysis, and Lepine ventures the opinion that the earlier appearance of these sequelæ may possibly be due to this treatment, in some cases at any rate. As he remarks, this is a general impression which is not yet statistically proved, and the unparalleled nervous disturbance due to the war must also be taken into account. Lepine also states that cases of shell shock may present symptoms closely resembling those of G.P.I.—inequality of pupils; twitching of facial muscles; halting speech; tremor of tongue; increased reflexes; and even lymphocytosis and increased globulin in the cerebrospinal fluid. Some such cases have been treated with salvarsan with disastrous results.

REFERENCES.—¹*Special Report Series*, 1918, No. 14, H.M. Stationery Office; ²*Ibid.*

1918, No. 19; ³*Jour. Amer. Med. Assoc.* 1918, i, 1157; ⁴*Lancet*, 1918, ii, 632; ⁵*Jour. Amer. Med. Assoc.* 1918, i, 279; ⁶*Ibid.* 1589; ⁷*Ibid.* ii, 87; ⁸*Amer. Jour. of Syph.* 1917, July; ⁹*Jour. Amer. Med. Assoc.* 1917, 1810; ¹⁰*Boston Med. and Surg. Jour.* 1917, ii, 557; ¹¹*Med. Rec.* 1917, ii, 675; ¹²*Jour. Amer. Med. Assoc.* 1917, ii, 2027; ¹³*Ibid.* ii, 2014; ¹⁴*Ibid.* ii, 1855; ¹⁵*N.Y. Med. Jour.* 1918, i, 783; ¹⁶*Jour. Amer. Med. Assoc.* 1917, ii, 907, 1004, 1080; ¹⁷*Presse Méd.* 1918, ii, 361; ¹⁸*Loc. cit.*; ¹⁹*Jour. Amer. Med. Assoc.* 1918, i, 296; ²⁰*Bull. Soc. Méd. des Hôp. d. Paris*, 1917, Feb. (N.Y. *Med. Jour.* 1917, ii, 524); ²¹*Pract.* 1918, Oct., 212; ²²*Bull. de l'Acad. de Méd. de Paris*, 1917, May, 558.

SYPHILIS, INHERITED.

Frederick Langmead, M.D., F.R.C.P.

Barbier¹ points out that the nervous system of the child may suffer predominantly from inherited syphilis, the clinical picture simulating meningitis, epilepsy, or insular sclerosis. If this be remembered, antisyphilitic treatment may be started in time.

Other nervous manifestations are periodical paroxysmal vomiting, enteralgia, and nocturnal enuresis. He describes seven examples of paroxysmal vomiting in children four, five, seven, and ten years old, of families with known syphilis in parents or grandparents. In some cases there were meningeal symptoms or other nervous manifestations. In one family, one child had enuresis and recurring intestinal colic; a second headache and vomiting about once a month; a third epileptiform attacks. The vomiting is spontaneous and unconnected with food. It is generally preceded by a few hours or days by violent frontal headache, which also accompanies it. There is no nausea, the child suddenly going pale and vomiting explosively. In some cases this was repeated as often as twenty times a day, and there was some blood in the vomit. The attack ends as suddenly as it began, and the child returns to his play. The intervals are irregular, two or three attacks of vomiting, or less, occurring each year. They are rarely shorter than a few months, but the condition may persist until puberty. The Wassermann reaction of the cerebrospinal fluid is always positive, a point which is important in diagnosis. The occurrence of fever favours the diagnosis of tuberculous meningitis.

REFERENCE.—¹*Arch. de Méd. des Enf.* 1918, June, 281 (abstr. *Jour. Amer. Med. Assoc.* 1918, i, 229).

SYPHILIS OF THE NERVOUS SYSTEM.

J. Ramsay Hunt, M.D.

Now that the intravenous and intraspinal methods of treating syphilis with Salvarsan are well established, we are beginning to obtain data upon which cases may be selected for these respective forms of treatment, and from which we can estimate the results which may be anticipated in such intractable affections as tabes and paresis. We also learn that men of large experience are beginning to doubt the efficacy of the intraspinal method, believing that nothing more is accomplished by this procedure than by intravenous medication, a far less dangerous route. B. Sachs¹ has lately supported this point of view. He makes no extravagant claims for the intravenous method, but claims that there is nothing which the intraspinal method achieves that cannot be accomplished by the intravenous. His impressions, based on experience of the actual achievements by the intravenous injection of salvarsan, are as follows: The best results are obtained in the cases of cerebrospinal syphilis that are either distinctly vascular in origin or are of the meningo-encephalitic and meningomyelitic type. The meningosyphilitic cases that so often suggest the possibility of latent paresis have been cleared up by a few salvarsan injections. There is often difficulty in establishing the differential diagnosis between these meningo-excephalitic cases and those of true general paresis, so that the doubt may arise whether or not some of the cases of general paresis claimed as cures may not have been cases of this type. Meningomyelitis of the syphilitic type

also yields to intensive treatment in the most satisfactory way. The spastic forms of spinal paralysis—the Erb type in particular, which is in all probability a form of a true degenerative disorder—give unsatisfactory results. As for tabes dorsalis, he claims no actual cure; but in reviewing cases and seeing the patients months and years after treatment had been instituted, he has no doubt that the patients were satisfied with the results of treatment; that they were better in many ways, and that we cannot afford to disregard this treatment in tabes, without, however, claiming more for it than the results justify. There is no doubt that in many instances the vesical symptoms, the sexual impotence, the lightning pains, even the gastric crises, have disappeared under intensive intravenous treatment. On the other hand, he is firmly convinced that in a large number of cases, particularly in private practice, in which the intravenous treatment has been given from the outset, the symptoms have progressed, and full-fledged tabes dorsalis has been developed in much the same way that it would have progressed if no active treatment had been given. The meningo-myelitic forms of a tabetic type are the ones that can be benefited most readily. Finally, in general paresis, **Salvarsan** treatment has not helped him to effect a cure, but it has in some instances retarded the rapid progress of the disease. It has permitted, if not caused, marked remissions to be established for a considerable period of time.

Prof. J. A. Fordyce,² a noted advocate of the intraspinal method, has answered Dr. Sachs' criticisms, and presents with clarity the advantages, indications, and results of the intrathecal procedure. His conclusions are: In tabes, certain types of cerebrospinal syphilis like meningitis, meningo-myelitis, meningo-encephalitis, and in optic atrophy with positive findings in the fluid, intraspinal treatment succeeds in relieving or curing the conditions after failure of intravenous and other treatment. It is the only procedure that can be employed after the intravenous treatment fails or when the patient develops an intolerance to arsenic. With proper technique and experience, it is less dangerous than intensive intravenous treatment. In paresis with stigmata of degeneration, the most to be hoped for is temporary arrest of the encephalitis. There are border-line cases of meningo-encephalitis which simulate paresis and which are curable by the treatment in question. The criticism of the intraspinal method is based largely on the results following imperfect technique and its employment in cases without clear indications afforded by spinal-fluid examination. Aside from these reasons, it has been condemned after short and imperfect trials. In some cases the existing lesions are activated by early injections and cured by persistence in the treatment. The future of the syphilitic individual and the hope of anticipating or arresting the incurable degeneration are largely dependent on early and systematic examination of the spinal fluid.

Cummer and Dexter³ also express themselves strongly in favour of this method, and conclude after five years' experience with the use of **Arsphenaminized Serum**, that, properly employed, it is not in any sense dangerous, and excellent evidence of its efficacy is offered by patients who repeatedly endure the painful though harmless reactions which often follow intraspinal injections. Little or nothing can be expected in fully developed paresis. Much advantage is derived in many cases of tabes dorsalis and syphilitic meningitis when other methods have proved inefficient. The results of the laboratory examinations of the blood, and particularly of the spinal fluid, must be considered as an integral part of the clinical picture, both in the diagnosis and in the direction of treatment. The improvement in the satisfactory cases has been so definitely consequent on active treatment, and the ground gained over a period of years been held so well in spite of the lack of recent treatment, that it cannot be

explained as a coincident remission in the progress of the disease. The method is a distinct addition to our therapeutic armamentarium.

The question of the *circulation of arsenic in the cerebrospinal fluid* has been investigated by Rieger and Solomon.⁴ Of 123 cerebrospinal fluids collected at intervals ranging from five minutes to twenty-three hours after intravenous injection of 0.3 to 0.6 grm. of arsphenamin, 38 showed appreciable amounts of arsenic. The largest amount found was 0.6 mgrm. of arsenious oxide in 1.0 c.c. The average amount was 0.18 mgrm. per cubic centimetre. The shortest interval at which arsenic was found was thirty minutes; the longest two hours. With successive injections, the fluids in general show progressively smaller amounts of arsenic for the same time interval. Usually, those patients consistently showing the larger amounts of arsenic in their fluids made the more rapid improvement. It is suggested that intravenous injections of divided doses at one- or two-hour intervals would prove more effective in maintaining a high concentration of arsphenamin in the blood for longer periods, and thus possibly allow increasingly greater amounts to pass into the perivascular spaces. What, then, is emphasized by the foregoing is the necessity of maintaining a maximal concentration of arsphenamin in the blood for longer periods than has heretofore been the practice, so that increasingly greater amounts will pass into the perivascular spaces. The pleocytosis, increase in protein, and in the positivity of the Wassermann reaction in the midst of apparently intensive treatment, can only mean that the arsphenamin has failed to reach the seat of the spirochætos in lethal concentration, and has stimulated rather than checked the process. It is hoped to meet the condition set forth, by successive intravenous injections at one- or two-hour intervals of small doses, perhaps supported by multiple intramuscular injections.

Ophthalmic Changes in Tabes and Paresis.—Wechsler⁵ has studied the ophthalmic changes in 122 cases of locomotor ataxia and dementia paralytica, and reviews the more recent pathological conceptions concerning the ocular complications of so-called parasyphilis. The consensus of opinion at present is distinctly in favour of the inflammatory origin of all such symptoms. In other words, primary optic atrophy in paresis and tabes does not exist. It is always a secondary process, although the degenerative factor may outweigh in importance the primary inflammatory reaction which preceded it. The importance of this conception from the standpoint of treatment is obvious. He summarizes the results of his clinical studies in two tables, for which the original paper may be consulted.

In the opinion of the writer, syphilis is one continuous disease, and while for convenience of classification one may speak of a primary, secondary, tertiary, or even quaternary stage, or the old meta- and parasyphilitic stages, from the standpoint of pathology there is no fundamental difference between them. The difference, if any, lies in the reaction of the structures of the body at various periods after infection, or in the varied action of the spirochæte after numerous vicissitudes in the body. It may safely be argued that the underlying pathological process of any syphilitic lesion, whatever its chronological manifestation, is essentially of one character, differing only in degree at various times and under various conditions, and depending upon the structures involved. Thus, while in so-called cerebrospinal syphilis the vascular, inflammatory, exudative process overbalances the degenerative changes, in tabes and paresis the latter is more marked and often completely overshadows the former. After study of the more recent investigations concerning the pathology of neurosyphilis, particularly with reference to optic changes, he believes that there is no fundamental difference between tabetic neurosyphilis and so-called cerebrospinal or, better, diffuse neurosyphilis. It seems evident that an inflam-

matory process is behind every form of syphilitic involvement, and that the spirochæte is at the bottom of the reaction.

Acute Syphilitic Meningitis is a rare manifestation of the disease, and when present may give rise to serious diagnostic error. The fact that the majority of syphilitic nervous affections are generally conceived of as running a semi-chronic if not actually chronic course may have thrown somewhat into the shade the idea of a syphilitic infection of the meninges as acute, as abrupt, and as serious as that of any other toxi-infective condition. It is no doubt better recognized than formerly that meningeal irritation is of common occurrence in the secondary period of syphilis in the shape of rachialgia, paræsthesiæ in the limbs, muscular tiredness and weakness, and increased activity of the cutaneous and deep reflexes, possibly also some slight irritability of the bladder. There may also, however, develop an actual acute meningitis, a clinical entity due appreciation of which is of prime importance from a therapeutic point of view. So well established may be the usual symptoms and signs of acute meningitis, that its distinction from acute tuberculous or acute cerebrospinal meningitis becomes a matter of considerable clinical and pathological interest. Wilson and Gray⁶ report in detail an interesting example of this localization of syphilis, and state that acute syphilitic meningitis may be regarded as appearing under three phases or at three periods in the course of syphilis: (1) It may occur as an acute exacerbation in cases of congenital syphilis; (2) It may develop during the secondary period, either with or very soon after the cutaneous exanthem, or even at a pre-roseolar stage; (3) It may be an episode in the tertiary stage, arising in the course of a chronic gummatous syphilis, long after infection, and sometimes when the lesions in the nervous system have appeared to be latent or quiescent. In the first and third of these the meningeal syndrome occurs along with other symptoms or signs of syphilis, whereas in the second the clinician may be faced with the picture of an acute meningitis *per se*, and he must depend for his diagnosis on the history, or an examination of the cerebrospinal fluid, or on certain variations in the clinical symptom-complex.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1917, 681; ²*Ibid.* 1482; ³*Ibid.* 1918, ii, 788; ⁴*Ibid.* 15; ⁵*N. Y. Med. Jour.* 1918, ii, 181; ⁶*Brit. Med. Jour.* 1917, 419.

TABES. (See SYPHILIS OF NERVOUS SYSTEM.)

TACHYCARDIA. (See also SOLDIER'S HEART.) Carey Coombs, M.D., F.R.C.P.

ETIOLOGY.—Tachycardia is either cardiac or supracardiac (i.e., nervous) in origin. How are we to distinguish these types? Obviously it is necessary to do so, for on the distinction rests all prognosis and treatment.

First, true paroxysmal tachycardia is always cardiac in origin. Its characteristics are denoted in the name; the pulse is quick in attacks only. Moreover: (a) The pulse-rate during the attack is usually a simple multiple of that observed between attacks; (b) The attack begins and ends abruptly, the rhythm passing from normal to abnormal, and vice versa, in a single beat. Price¹ gives a good general account of this disorder. Hume² records six examples seen in soldiers, and Koplik³ three cases in children. In only one of Hume's patients could a definite cause (diphtheria) be found, and the same is true of Koplik's observations; only one of the three children had at all recently harboured any conceivably causal infection. Yet there is no doubt, from general considerations, that these attacks arise from a morbidly irritable spot somewhere in the cardiac wall.

Second, true cardiac tachycardia is not by any means necessarily paroxysmal. There is the familiar fact that the diseased heart quickens *pari passu* with decrease in its reserve force. There are also cases of cardiac disease in which

the heart beats at a great rate at the time. For example, Marris⁴ brings forward a case of permanent myocardial disease developing during enteric fever; during the fever the pulse became fast, and remained so, during sleep as well as in the daytime, after convalescence, other evidences of persistent myocardial disease also making themselves known. And similar cases of permanent unvarying tachycardia associated with obvious organic disease will readily occur to experienced observers.

Third, in the condition known as auricular flutter we have a bridge between the paroxysmal and the persistent types of cardiac tachycardia. As Price³ says, "it may persist for only a few minutes and never return, or it may last for days, weeks, or even for years, recurring at intervals." Essentially it is a regular tachycardia of the auricles, which beat at the rate of about 300 times per minute; but as a fraction of these beats is blocked, the ventricle beats at a slower rate, most often at half that of the auricle. As in paroxysmal tachycardia, the onset and offset of the rapid rhythm are abrupt.

What are the points common to these various types of cardiac tachycardia? How do they differ from the 'soldier's heart' type, the fast pulse of emotion, and the thyrotoxic tachycardia? In this respect essentially, that there is an 'all or nothing' quality about the cardiac types; either the heart is beating at 120 or thereabout, or not quickly at all. In the supracardiac types, on the other hand, posture, excitement, exertion, swallowing, and so forth, exert an obvious influence on the tachycardia, which slows down or speeds up for a few beats and returns to its original as the cause of the disturbance ceases to operate.

There are two other types of organic tachycardia that call for notice: the ever-quickening pulse of progressive ventricular failure, in which the rhythm remains regular, and the fast irregular pulse of auricular fibrillation. The former is quantitative evidence of ventricular exhaustion; the latter, qualitative and quantitative evidence of auricular breakdown. The word 'tachycardia' is best avoided in describing these conditions, as the pulse-rate is not the central fact of the situation; and the remarks that follow do not apply to either of these types.

PROGNOSIS.—As Price points out, it is impossible to say whether tachycardia in paroxysms will recur and continue to do so; and this is also true of the outlook as to persistence of auricular flutter. But apart from this point, the prognosis is to be made after a general consideration of all the evidence as to cardiac disease. If the ventricle is in good condition, the tachycardia, however long sustained or often repeated, will not bring about its downfall, though of course continued overaction is not good for the myocardium.

TREATMENT.—Here again it is the underlying condition that has to be treated primarily; but for the arrest of the paroxysms various measures may be taken. Often the victim discovers some means of relief for himself: a carminative, some particular posture, and so on. In one of Koplik's cases the attack was checked by *Digitalis*, and Price speaks well of *Strophanthin* injected intravenously, one dose of gr. $\frac{1}{100}$, or two or three of gr. $\frac{2}{300}$ at intervals of two hours. In prolonged attacks of flutter, the systematic administration of *Digitalis* is indicated. In either form the question of rest is to be answered by consideration of all the features of the case. Subjective distress, and evidences of circulatory embarrassment, are indications for complete rest. It is wonderful how quickly the symptoms clear up when the attack of tachycardia has passed off; except of course in cases of advanced organic disease where the tachycardial paroxysm is but an aggravation of an already grave position.

REFERENCES.—¹*Lancet*, 1918, i, 521; ²*Quart. Jour.* 1918, Jan., 131; ³*Amer. Jour. Med. Sci.* 1917, ii, 834; ⁴*Lancet*, 1918, i, 667; ⁵*Ibid.* 491.

TALIPES. (*See FOOT, DEFORMITIES OF.*)

TENDONS, WAR SURGERY OF. (*See ORTHOPÆDIC SURGERY.*)

TESTICLE, CARCINOMA OF.

J. W. Thomson Walker, M.B., F.R.C.S.

Geist and Thallimer¹ have studied the histology of carcinoma of the testicle in 26 tumours. There were 16 medullary or alveolar carcinomata, and 4 adenocarcinomata which all presented medullary and papillomatous areas. Six teratomata containing carcinoma were studied. The commonest tumour of the testicle is the medullary carcinoma commonly described as a large-cell alveolar tumour. The cells closely resemble those of the seminiferous tubules, and in some areas there are appearances suggestive of direct transition from tubular epithelium to tumour cells. The common type of carcinoma associated with teratoma is adenomatous in character. Adenomatous tumours may have their origin either from the tubuli recti, from adenomatous structure of a pre-existing teratoma, or possibly from seminiferous tubules.

REFERENCE.—¹*Ann. Surg.* 1917, Nov., 571.

TETANUS.

W. I. de C. Wheeler, F.R.C.S.I.

The success of **Antitetanic Serum** as a prophylactic agent has been proved beyond doubt by the experiences of the war; so much so that in civil practice the prophylactic injections of at least 500 U.S.A. units should become a routine practice in all cases of suspicious wounds. The association between prophylactic inoculation and the lengthening of the incubation period is clear, and it is well known that the longer the incubation period the more likely is recovery to take place. As regards the therapeutic effect of antitoxin the evidence is still inconclusive. Prophylactic injection has produced a new form of tetanus, familiar now under the term *local tetanus*. It is probable that tetanus toxin does not enter the nervous system by lymphatic or blood channels, but along the motor nerves and through the protoplasm of the neurons themselves. Antitoxin, on the other hand, is carried by the lymph and blood, and it is doubtful if it ever reaches the nerve-cells. The importance of prophylactic injection in civil practice is emphasized by the following note.¹

Of 9 cases in which no prophylactic dose of antitetanic serum had been given, 6 arose in England. One patient was infected with garden soil when acting as a gardener; another had a finger crushed with a blow from a hammer at a farm; 2 cases followed operation for appendicitis; 1 followed a fall on a garden path; and the last was the case of an artillery officer serving at home. With regard to the influence, if any, of promptitude in giving prophylactic injections on the rate of mortality, the most recent figures do not seem at all conclusive; it is quite possible, however, that the rate of incidence may be affected, though on this point no figures are at present available. All the cases received therapeutic treatment with antitetanic serum. There appears to be no difference in the rate of mortality in cases of tetanus according to whether the wound is complicated by a fractured bone or not. It has not at present been ascertained if there is any difference in the rate of incidence, but it seems probable that this rate would be greater in wounds complicated by fractures. Once again the question is asked whether there is any evidence that the intrathecal route has any advantage over the other methods of injection.

The writer has had recently under his care a boy, age 16, who developed acute tetanus following a small 'clean' cut on the left eyebrow; he received the injury from a blow of a hockey-stick. On the fifth day he had trismus and difficulty in swallowing; swinging movements of the jaw were present, and

there were no general spasms. On the sixth day the left side of the face was paralyzed, general spasms supervened, and death occurred on the eighth day. No prophylactic injection had been given; the case was seen for the first time when trismus was already established.

Professor Sherrington, in experimental work among monkeys, appears to show that toxin firmly united to nerve-cells can be detached by sufficient concentration of antitoxin in the surrounding lymph spaces.

Du Bouchet² recommends treatment by intravenous injection of **Persulphate of Soda** combined with **Antitetanic Serum**. He quotes seven cases, all of which recovered. The treatment consists in injecting in a vein once or twice a day, according to the gravity of the case, 20 c.c. of a pure and neutral 5 per cent solution of persulphate of soda. This is continued for eight to fifteen days, the frequency being regulated by the progress of the spasmodic symptoms. The persulphate should be kept dry and in the solid state. Solutions should not be kept for more than a few days, as heat decomposes them. It is best to prepare solutions as required. There may be vomiting in some cases shortly after injection.

Salaman,³ in recording 10 cases, mentions 2 which are of outstanding clinical interest. He draws special attention to the absence of swinging lateral movements of the jaw as an early symptom. In one case the tetanic condition was absolutely localized to the group of muscles surrounding the wound, and might easily have escaped notice, but that the author was particularly on the look-out for this type of tetanus. He received 48,000 units in fourteen days by intramuscular injection, and had had a prophylactic injection at the time of his wound fourteen days previously.

An improvement in the prophylaxis of tetanus is sought by Tulloch⁴ in common infections in war wounds which lead especially to devitalization of muscles. It may be stated broadly that in each case devitalization of tissue would enhance the infectivity of the *B. tetani*. The devitalizing factors are: (1) Trauma; (2) Concomitant infection with other organisms. After an examination of the influences of the toxin of *B. welchii* upon the development of tetanus spores *in vivo* and of *Vibrio septique*, he comes to the following conclusions:—

1. There is good ground for believing that the ancillary part played by *B. welchii* in the causation of tetanus is clearly defined and can be almost eliminated by the use of the antitoxin for *B. welchii*.

2. The capacity shown by the toxin of *Vibrio septique* for stimulating the growth of tetanus spores *in vivo* is more variable than is that of *B. welchii*, and experiment indicates that it too may play a part in the causation of tetanus.

3. Antibodies to the toxins of *B. tetani*, *B. welchii*, and *Vibrio septique* should be included in all serum employed for the prophylaxis of tetanus.

4. While such a polyvalent serum promises to reduce still further the incidence of tetanus, it would be too optimistic to assume that it would absolutely eliminate that disease, for other infections may also play a part in stimulating the growth of *B. tetani* in wounds.

Burrowes⁵ records a case of splanchnic tetanus. The symptoms closely resembled hydrophobia; trismus was entirely absent, there was no involvement of the limbs, the patient used his arms and hands freely during the respiratory spasms. Splanchnic tetanus follows infection through wounds of the chest or abdomen. The outstanding features of this case were the hyper-tonicity of the sternomastoid and other muscles of the neck, including the trapezius. He could not cough or take a deep breath. Attempts to take water or nourishment caused violent respiratory spasms in which the muscles of the neck and spine took part. The face denoted acute apprehension,

indicative of fear of asphyxia. Just before death the temperature rose to 106.4°. Previously it had remained at or about 100°.

In considering the single symptom of trismus, Louis Bazy, in the French supplement of the *Lancet*,⁶ makes the following observations :—

a. Tetanus without Trismus.—In these cases the injected antitoxin has prevented the fixation of the microbic poison on the central nervous system, limiting its action to the motor nerves of the wounded limb. These cases are much less grave than the other forms.

b. Tetanus with Late Trismus.—The bulbo-medullary centres are only incompletely protected. There is noted a late or incomplete trismus accompanying the local contracture. The prognosis is here less favourable.

c. Tetanus with Immediate Trismus (trismus d'emblée).—Here the protective effect of the serum is exhausted; the route has again become free for the penetration of the toxin, and the higher centres can be affected. These cases are almost always fatal.

To compare the relative gravity of these different forms Bazy gives some very eloquent statistics from Lumière :—

POST-SERIC TETANUS.

	(a)	(b)	(c)	(d)	Total
Number of cases	15	13	26	27	81
Cured	11	8	8	7	34
Died from tetanus	1	3	17	19	40
„ „ intercurrent affections ..	3	2	1	1	7

(a) Without trismus; (b) With trismus delayed or attenuated; (c) With trismus *d'emblée*; (d) Tetanus without preventive injection.

With regard to the curative treatment of tetanus, the following table is reproduced from the MEDICAL ANNUAL, 1918, p. 548. The figures refer to U.S.A. units of the serum.

Day	Subcutaneous	Intramuscular	Intrathecal
1st day ..	—	8,000	16,000
2nd day ..	—	8,000	16,000
3rd day ..	—	4,000	8,000
4th day ..	—	4,000	8,000
5th day ..	2,000	—	—
7th day ..	2,000	—	—
9th day ..	2,000	—	—

REFERENCES.—¹*Brit. Med. Jour.* 1918, ii, 415; ²*Surg. Gyn. and Obst.* 1917, Sept. (abstr.), 242; ³*Lancet*, 1917, ii, 975; ⁴*Brit. Med. Jour.* 1918, i, 614; ⁵*Lancet*, 1917, ii, 970; ⁶*Ibid.* 1918, ii, 523.

TETANY.

Frederick Langmead, M.D., F.R.C.P.

J. Howland and W. McKim Marriott,¹ in an important contribution, give the results of their researches into this condition. After discussing the various theories of its pathogenesis, which refer its causation to: (1) Disease of the parathyroid glands; (2) The character of the food; (3) Intoxication by calcium; (4) Intoxication by guanidin and methyl-guanidin; (5) Lack of

calcium; they consider that the evidence at present available fails to establish the majority of these theories. Experimentally they approached the problem from the standpoint of the calcium content of the blood-serum. By a special method they were able to show that the normal calcium content of the serum is from 10 to 11 mgrms. per 100 c.c. In rickets there is a moderate reduction of the calcium in some cases, but a number of apparently active cases showed a normal amount. In tetany, during the active symptoms, the calcium of the serum is invariably greatly reduced, and may fall as low as 3.5 mgrms. The average calcium content in 18 cases was 5.6 mgrms. In convulsive disorders, other than tetany, there is no reduction in the calcium. The cause of the reduction in tetany has not been explained. The magnesium of the serum is within normal limits. Tetany results at times from the administration of large doses of sodium bicarbonate, but there was no evidence that 'alkalosis' is a factor in the production of infantile tetany. Cathodal hyperexcitability has invariably been accompanied by a marked reduction in the calcium, and anodal hyperexcitability, generally, by a slight reduction. A point of much practical importance is that these workers found that Calcium administration produces a prompt effect upon the course of tetany. In a few hours the spasmodic symptoms disappear, but the calcium must be continued for a long time. Calcium chloride, given by the mouth, causes an increase in the calcium of the serum, coincident with the cessation of symptoms, although in most instances the calcium of the serum does not quite return to normal.

REFERENCE.—¹*Quart. Jour. Med.* 1918, July, 289.

THORAX, WOUNDS OF. (See also EMPYEMA; HEART AND BLOOD-VESSELS, SURGERY OF.) *H. S. Pendlebury, F.R.C.S.*

Indication for Early Operation.—G. E. Gask and K. D. Wilkinson¹ advocate early operation in the following conditions: (1) A ragged wound of the soft parts; (2) Compound fracture of ribs; (3) Bleeding from parietal wound; (4) Suction of air into the pleural cavity; (5) Retention of a large foreign body in an accessible position; (6) Pain (often the result of indriven splinters of rib scratching the lung with every respiratory movement); (7) Rapidly increasing pneumothorax due to valve-like opening into the pleural cavity, which allows air to be sucked in and prevents its expulsion.

J. Anderson² considers that early operation is essential in the following cases: (1) Wounds caused by large irregular fragments of high-explosive shell which have lodged in the thorax: these are almost always associated with (a) clothing and infection carried in, and (b) open 'sucking' wounds of the chest wall; (2) Tangential wounds of the thorax, enfiling the ribs and driving portions of bone, etc., into the pleura and lung; (3) Entrance and exit bullet wounds in which the exit wounds are 'explosive' in character.

A. L. Lockwood³ adds the following conditions: (1) When injury to the diaphragm is suspected; (2) 'Stove-in' chests; (3) Any badly infected wound.

Methods of Early Operation.—Gask and Wilkinson¹ and Anderson² advocate the removal of injured soft parts and all splinters of bone and foreign bodies, removing if necessary more rib, so as to afford a good view of the parts; excision of injured lung, and suture of the edges of the raw surfaces left. These authors, together with A. L. Lockwood,³ W. Hutchinson,⁴ J. E. H. Roberts, and J. G. Craig,⁵ J. L. Roux-Berger and A. Policard,⁶ have come to the conclusion that the thorax should be completely closed at the end of the operation, Anderson advising that an antiseptic, such as **Flavine** or **Brilliant Green**, should be left in the pleural cavity. These conclusions have been arrived at after the analysis of some thousands of cases. H. M. W. Gray states that

the results with closure of the thorax are 20 per cent better than with drainage, and that the treatment is prophylactic against sepsis.

Gask and Wilkinson,¹ Lockwood,³ and Roux-Berger and Policard,⁶ give excellent accounts of the technique they find most effective.

Contra-indication for Early Operation.—Gask and Wilkinson¹: “(1) Shock and collapse, such as would be contra-indications for any surgical procedure. (2) Small clean wounds, without evidence of serious intrathoracic injury. (3) Retention of a small foreign body in the lung or mediastinum. In our experience of early convalescence, the foreign body, if small, may be disregarded. We are not in a position to speak of the ultimate results. (4) Collapse of opposite lung, as indicated by inspiratory retraction of the chest wall on the opposite side to the wound. In this condition an anæsthetic and opening of the chest may be fatal.”

Pneumothorax.—Gask and Wilkinson,¹ Hutchinson,⁴ and Sir John Rose Bradford³ have written in detail on this subject. Their conclusions are that it is a rare condition, and may be present with or without a wound of the thoracic wall. In the former case the wound may be large, or it may be of the ‘sucking’ variety (that is, the pneumothorax is ‘open’); the lung is usually not completely collapsed; and distress can be alleviated by closure of the wound, which procedure should be carried out as soon as possible. In the latter case the pneumothorax is ‘closed,’ and the lung is completely collapsed. This variety may be sterile or infected, and if infected the thorax must be opened and cleaned at once.

Bradford³ and C. Dean⁸ mention that massive collapse may occur without pneumo- or hæmothorax, and occurs in penetrating and also non-penetrating wounds of the chest. It may be total, partial, or lobar, and may occur on the contralateral side. The physical signs of massive collapse are: immobility and retraction of the chest wall, displacement of the heart towards the affected side, elevation of the diaphragm on the affected side. The signs may resemble those of pneumonia, but the diagnosis can be made from the position of the heart and diaphragm. The signs vary with the period of the condition: in the first period there is weakness or absence of breath sounds; in the second period there is tubular or amphoric breathing; and in the third period râles and crepitations appear.

Hæmothorax.—The signs of a moderate hæmothorax may simulate those of consolidation (Bradford³).

TREATMENT.—Sir B. Moynihan⁵: “In cases of hæmothorax when the blood effused is small in quantity and remains sterile, no active measures are necessary, unless absorption is long delayed. Aspiration, repeated if necessary, may then be performed. In cases where the blood effused is large in amount and remains sterile, aspiration after the seventh or eighth day, or earlier in cases of urgent dyspnoea, certainly hastens convalescence, permits a more rapid expansion of the lung, and prevents the formation of firm adhesions which may permanently cripple the free movements of the lung.”

Hutchinson⁴ advises aspiration with a large trochar, under a local anæsthetic, making a skin incision if necessary to allow the free passage of the trochar. Exhaustion in this case should be slow, especially if there is an associated pneumothorax. If the hæmothorax is large, and there are large blood-clots, aspiration will be impossible, and he then advises thoracotomy and, after clearing out the clot, closure of the wound. Bradford³ agrees with Hutchinson, but points out that aspiration must be high, and in these cases the diaphragm is raised, and states that replacement of the hæmothorax with oxygen is sometimes of value.

Professor Tuffier³ treats all persistent cases of hæmothorax—that is, any

which have lasted from two weeks to two months—by thoracotomy, separating the ribs by means of his 'separator,' and if the chest wall is immobile he decorticates the lung. He has met four cases of encysted interlobar hæmothorax, all of which cleared up after puncture.

Venous Re-infusion of Blood Extracted from the Pleural Cavity in Hæmothorax.—W. A. Brennan¹¹ gives an account, taken from Elmendorf (*München. med. Woch.*), of a useful treatment for those cases of hæmothorax when the intrapleural hæmorrhage appears to be arrested, but where the patient is suffering from lack of hæmoglobin. Some of the blood was withdrawn from the hæmothorax and immediately transfused into the vein of the patient, with subsequent recovery of the patient.

Infected Hæmothorax.—Bradford³ calls attention to the 'cracked-pot' percussion note of an infected hæmothorax that replaces the dull area of a previously sterile hæmothorax. He describes five types of infected hæmothorax: (1) Severe and fulminating cases presenting symptoms that resemble those of secondary hæmorrhage or of progressive pneumothorax: (2) Cases with symptoms of a milder type, but still severe, e.g., urgent dyspnœa, tachycardia, pain: such cases may be mistaken for pneumonia owing to the fever, dyspnœa, and blood-stained sputum; (3) Cases with severe symptoms suggesting infection, but in which the bacteriological report states that the pleural fluid is sterile; (4) Cases with no urgent symptoms and with little or no pyrexia, but in which the pleural fluid contains organisms, and has in some cases an offensive odour; (5) Cases of delayed infection: these cases run a course similar to that of non-infected cases, i.e., have no urgent symptoms for perhaps ten or fourteen days, and then suddenly urgent symptoms characteristic of infection occur. He and Hutchinson⁴ both agree on the importance of early diagnosis, and advocate immediate thoracotomy, cleansing of the pleural cavity, and closure of the wound, leaving some antiseptic, such as B.I.P.P., inside the chest. Bradford follows this up by repeated aspiration. Hutchinson does not advise removal of the foreign body at the base in France.

Tuffier² agrees with the above treatment, and decorticates any thickened pleura; but instead of closing the wound at once, he inserts seven or eight Carrel-Dakin tubes, supported on wires if necessary, and flushes out the cavity with Dakin solution every two hours until it is sterile. This takes from nine to thirty days. He then closes the wound.

Dobson⁷ does not advocate closure in all cases, but only in the early stages of infection.

J. Campbell¹² describes a method of sterilization of the pleural cavity. He fills up the cavity every four hours with Dakin's solution, by means of a drainage tube, places the patient on the sound side, and leaves the fluid inside for two hours. He then syphons it off.

C. Dean⁸ thinks that pneumococcal infection is better treated by aspiration than by operation, and that a lower mortality is brought about by earlier diagnosis, and more efficient treatment of sepsis, than by early prophylactic operation undertaken as a routine.

Chronic Empyema.—Tuffier² advises operation in three stages to cure cases of chronic fistula: *1st Stage:* Débridement and incision of pleural adhesions and examination of the pleural cavity. *2nd Stage:* Chemical disinfection. Dakin's solution may be used, but must be used with care. The quantity that can be injected gives the size of the cavity. *3rd Stage:* When sterile, partial or total decortication is performed, and for this to be effectively carried out, a large incision must be made in the chest wall. Care must be taken not to make bronchial fistulæ, and if this is accidentally done, they should be

sutured. The thorax is then closed. He says: "Surgical tendencies are now exactly contrary to those which formerly prevailed; the thoracic cage is no longer placed before the lung in importance, and the lung must always be considered before the chest wall. The advantages are considerable for the functional future of the patient; the lung resumes its normal activity, whereas in the old methods of treatment everything tended to destroy it."

Roux-Berger and Policard⁶ advise removal of any fractured rib present, followed by decortication of parietal and visceral pleura.

L. Bérard and Ch. Dunet⁹ express the opinion that persistent fistulæ are often caused by the presence of excessive infected callus, involving, it may be, other ribs than the one originally fractured; and that complete cure can only be anticipated after removal of all the infected callus, which may be very extensive.

COMPLICATIONS.—1. *Injury to Diaphragm*.—Lockwood³ considers that repair of the diaphragm is more urgent than that of any hollow or solid organ in the

abdomen, and that injury to the diaphragm should be treated by the thoracic route. Gask and Wilkinson¹ say that, in cases of multiple wounds, the abdomen should be treated first; but H. M. W. Gray² considers that the chest should come first. In dealing with the diaphragm, suture must be airtight, and this can be ensured by suturing the diaphragm to the chest wall.

2. *Injury to the Liver*.—Lockwood³ follows the track through the diaphragm into the liver, removes the foreign body, cleans the track with a Volkmann's spoon and swabs wrung out in saline or ether, and closes the liver with catgut to stop all oozing.

3. *Injury to the Pericardium*.—Bradford³ quotes cases of hemo-pericardium that have been drained with success, and Dean⁸

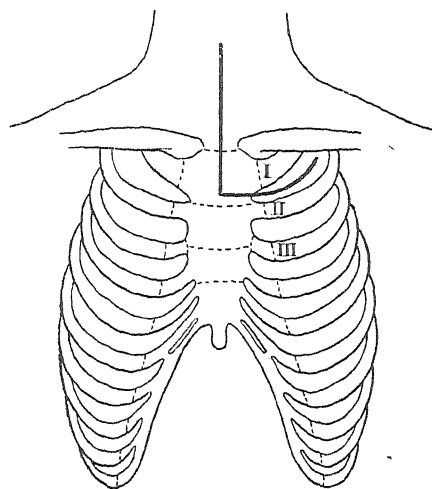


Fig. 138.—Le Fort's incision for foreign body in superior mediastinum.
(From 'La Presse Médicale'.)

discusses cases of pericarditis, with and without effusion.

4. *Foreign Body in the Superior Mediastinum*.—R. le Fort¹⁰ has devised an ingenious method of access to the superior mediastinum. He makes an incision as in Fig. 138. He then splits the manubrium vertically in the midline, and transversely on the left side between the 1st and 2nd ribs. By incising the 1st intercostal space, the left half of the manubrium, attached to the clavicle and 1st rib, can be raised as a flap. Lockwood³ enters the mediastinum through the sternum.

Aneurysm of one of the large vessels may be a complication of wounds of the chest (Bradford³).

ANÆSTHETIC.—Lockwood³ recommends paravertebral anæsthesia with local infiltration for slight cases, and gas and oxygen combined with local anæsthesia for severe cases. He thinks ether and chloroform should not be used. Roberts and Craig² combine omnipon and scopolamine with paravertebral and local anæsthesia. Gask and Wilkinson, on the other hand, recommend a

general anæsthetic such as chloroform in a Shipway apparatus, or gas and oxygen. Dean advocates a light chloroform anæsthesia.

MORTALITY.—Saultau,³ from returns from the greater part of the British front during 1917, gives the following figures: At the field ambulance station, 7 per cent; casualty clearing station, 17·18 per cent; base, 6 per cent; of the whole unit, 27·5 per cent. P. Duval and E. Vaucher³ give the mortality as 30 per cent, while Gask and Wilkinson report it as 20·8 per cent.

REFERENCES.—¹*Brit. Med. Jour.* 1917, Dec. 15; ²*Ibid.* Nov. 3; ³*War Medicine*, 1918, Aug.; ⁴*Brit. Med. Jour.* 1918, Feb. 16; ⁵*Surg. Gyn. and Obst.* 1917, Dec.; ⁶*Lyon Chirurg.* 1917, Nov.; ⁷*Brit. Med. Jour.* 1918, June 15; ⁸*Quart. Jour. Med.* 1918, Jan.; ⁹*Presse Méd.* 1917, Sept. 24; ¹⁰*Ibid.* 1918, July 22; ¹¹*Surg. Gyn. and Obst.* 1917, Oct.; ¹²*Brit. Med. Jour.* 1918, Jan. 26.

THROMBO-ANGIITIS OBLITERANS.

Carey Coombs, M.D., F.R.C.P.

In recent volumes of the *MEDICAL ANNUAL* (1910, p. 162; 1916, p. 103; 1917, p. 99; 1918, p. 549) the work of Buerger and others has been summarized. There is therefore no need to go over the ground fully. But three points may be alluded to.

PATHOLOGY.—Buerger¹ says: "The lesions in thrombo-angiitis obliterans are in chronological order: (1) An acute inflammatory lesion with occlusive thrombosis, the formation of miliary giant-cell foci; (2) The stage of organization or healing, with the disappearance of the miliary giant-cell foci, the organization and canalization of the clot, the disappearance of the inflammatory products; (3) The development of fibrotic tissue in the adventitia that binds together the artery, vein, and nerves."

TREATMENT.—Gottlieb² has found that medical men are prone to perform small and unnecessary operations for the relief of the trophic changes in the extremities which are a moderately early feature of this disease. He quotes, as examples of this misguided interference, incision of a swollen toe under the mistaken idea that cellulitis was present, and removal of a toe-nail to relieve trophic ulceration. Such operations are not only unnecessary but actually injurious, as they are followed by increase in the trophic lesions concerned, and even by exacerbation of the disease. He is indeed opposed to distal operations of any kind.

Ginsburg³ has tried, with very imperfect success, **Ligation of the Femoral Vein** below the entrance of the long saphenous vein. He does not recommend this operation, neither does he speak well of the intravenous injection of citrate of soda practised by some.

REFERENCES.—¹*Amer. Jour. Med. Sci.* 1917, ii, 319; ²*N.Y. Med. Jour.* 1918, i, 65; ³*Amer. Jour. Med. Sci.* 1917, ii, 328.

THYROID SURGERY.

W. I. de C. Wheeler, F.R.C.S.I.

It is stated that the blood-supply of the thyroid gland is so well cared for by nature that all the blood of the body passes through it once an hour. It weighs but an ounce; yet the secretion is of such importance that cretinism or myxœdema results from its absence. The secretion of the thyroid is a most active factor in the metabolism of the individual. In exophthalmic goitre or gland hyperplasia an enormous increase in the metabolic rate develops. The prognosis in a given case of exophthalmic goitre is one of importance to the practitioner. The patients, already highly nervous, are insistent upon knowing the likely course of the disease. Some early cases, with quick pulse, slight tremors, and enlargement of the gland, remain *in statu quo* or get well without treatment. Some well-established cases recover after about three months when treated with a judicious combination of absolute rest, radiotherapy, and sedative drugs. Others show a gradual tendency to increase, and in these

the symptoms produced by the hypersecretion of the gland may be cured by operation. A residue of cases go from bad to worse whatever the treatment employed. The hopeless cases finally develop sugar and albumin in the urine, an intermittent pulse from myocardial degeneration, and all the well-known signs of advanced hyperthyroidism.

Stanton¹ states that the height of the intoxication is produced usually during the first year. Towards the close of the second year he believes one-third of the cases have sufficiently recovered to be able to continue their normal occupations. Others improve at a later date, and he calculates there are 60 or 70 per cent of spontaneous recoveries after a period of five or six years. Stanton believes that the two major factors in non-operative treatment are rest and time. He concludes that removal of a portion of the thyroid gland of patients suffering from exophthalmic goitre produces a profound effect noticeable within a few days of the operation. The initial improvement, however, seldom amounts to a cure, and exophthalmos usually persists for months or years. He states that 80 per cent of the cases continue to improve, so that finally all traces of the disease disappear. There is a distinct place for both medical and surgical treatment in exophthalmic goitre, and each case must be considered on its merits.

Dunhill,² from a large experience of operating for Graves's disease, lays stress on the necessity of removing more gland substance than one lobe. He recommends the removal of a portion of the second lobe when necessary, working from below upward, so as to remove the larger lower pole, while leaving the small upper pole undisturbed. After this operation the percentage of successes was much greater. Dunhill believes, after careful study, that there is no doubt the degree of improvement following operation is much greater than that following x-ray treatment.

Bartlett³ also recommends subtotal thyroidectomy, and is convinced that a more extensive operation than the removal of one lobe is necessary for complete relief from toxic symptoms. This fact is substantiated from the Mayo clinic.

Sheehan⁴ recommends injection of goitre cases with **Carbolic Acid, Iodine, and Glycerin**. In one case of Graves's disease the result was remarkable. Five drops of equal parts of carbolic acid, tincture of iodine, and glycerin, are injected into the most prominent part of the goitre, usually at five-day intervals. In many of the cases five injections suffice, particularly in the ordinary enlargement which occurs in young women where there is no evidence of toxin absorption. If five injections do not suffice, many more can be given with perfect safety. The object of the treatment is to cause a sclerosis of the gland, thereby modifying the abnormal function of this organ and alleviating any pressure symptoms which may be produced by the enlarged gland.

Carbolic acid and tincture of iodine cause an inflammatory reaction in the gland, followed by cicatricial adhesions and consequent obliteration of the cells. Glycerin is used as a solvent. After the injection the patient complains of pain and swelling, the pain of which resolves into soreness after twenty-four hours. If the swelling and pain continue, **Codeine** in small doses, with ice applied over the goitre, will promptly give relief.

He concludes that: (1) Enlargement of the thyroid gland can be cured, or greatly minimized, by these injections; (2) No untoward symptoms have been observed by him from the injections; (3) Although only two cases of the graver forms of goitre have been injected with good effect, still it is certainly worth while trying in these severe forms, particularly when the case is not a fair surgical risk; (4) It is well, when injection treatment is started, to combine it with a course of **Arsenic** and with some form of the **Phosphates**.

Judd, New, and Mann⁵ make a report of the effect of trauma upon the *laryngeal nerves*. Section of the recurrent laryngeal nerve produces complete paralysis of the vocal cords, which in all probability will be permanent. Ligation of the nerve with linen, chromic catgut, or plain catgut produces a similar effect. Stretching does not impair the function of the vocal cord; pinching the nerves with a forceps produces temporary paralysis of the vocal cords, but restoration of the function always occurs, the length of time necessary for restoration depending upon the anatomical point at which the nerve was crushed. Usually, if the nerve is accidentally crushed at an operation, the time for regeneration is from thirty to sixty days.

REFERENCES.—¹*Amer. Jour. Med. Sci.* 1918, ii, 369; ²*Lancet*, 1917, Dec. 15; ³*Surg. Gyn. and Obst.* 1917, Oct., 402; ⁴*Med. Rec.*, 1917, ii, 591; ⁵*Amer. Surg.* 1918, March, 257.

TIC DOULOUREUX. (See NEURITIS AND NEURALGIA.)

TINEA IMBRICATA.

E. Graham Little, M.D., F.R.C.P.

Pijper¹ reports a case of this rare form of disease occurring in a Kaffir, from whose scales a fungus was grown in broth by a device which deserves notice. Contaminations usually frustrate attempts to grow the organism, and to avoid these the author proceeded as follows: The scales were placed in glucose broth, tubes of which were kept in the incubator for twelve hours. The scales were then removed, and the broth with the twelve hours' growth of other bacteria was sterilized by heat, and the scales were then returned to it, after which no further bacterial organisms grew, but a fungus developed from two of the scales. This fungus was regrown on Sabouraud media, forming a white star-shaped growth after four days, which later became grey in colour and crateriform in shape. Sometimes the margins showed a red tinge. The final proof of the causation, the production of the disease by inoculation of the fungus thus isolated, is wanting, as the author did not think the experiment justified in view of the intractable nature of the affection.

REFERENCES.—¹*Jour. Trop. Med. and Hyg.* 1918, Mar., 45; ²*Med. Jour. S. Africa*, 1918, June, 176.

TONSILS, DISEASES OF.

P. Watson-Williams, M.D.

Function and Significance of the Tonsils.—Mink¹ considers the tonsils serve a valuable function in breathing, and that the function is to supply water to the relatively dry inspiration current of air going to the lungs, and that an infective tonsillitis results from toxins in the lymph-stream carried to the tonsil, with resulting interference with the outflow of lymph from the tonsils, the coagulability of the lymph being heightened and tending to form a coagulum on the tonsils. He avoids operative treatment, and prescribes **Iodide of Potassium** after every case of fibrinous or phlegmonous angina, and uses the tonsil presser to squeeze out fibrin masses, and even the entire nasopharyngeal cavity is 'pressed out' with his catheter-like applicator, and iodine or silver solution applied.

Tonsilloscopy and Curettage of the Tonsils in Adults.—French² advocates the use of the **Tonsilloscope** for detecting diseased conditions by transillumination of the tonsil. He states that, with the exception of more or less sharply outlined shades of grey or black made by the concrete collections, there are only two colours seen, viz., amber—uniform amber denoting healthy tissue, with shades depending on the degrees of inflammatory reaction present—and rosy colour, denoting extensive disease. He illustrates the instrument used. French advises **Curettage** and **Alcohol Injections** for diseased tonsils in adults whose health is too impaired to render them suitable subjects for surgical risks.

Post-operative Hæmorrhage.—Of various contributions on this subject Irwin Moore³ and William Hill¹ afford valuable and full consideration of all points of importance, passing under review methods advocated by themselves and other laryngologists. Hill discusses hæmorrhage following enucleation, while Moore includes also hæmorrhage due to partial removal, i.e., incomplete tonsillectomy, and endeavours to reach some conclusion as to the relative frequency of post-operative hæmorrhage associated respectively with the complete as compared with the incomplete operation; but after weighing the evidence afforded by statistics and the conclusions of many authorities, Moore leaves this question unanswered, and it would appear that the relative frequency of troublesome hæmorrhage depends largely on the technique of the operator and other factors, e.g., the exclusion of unsuitable cases, and on prophylactic measures, rather than on the mere question of total removal, i.e., enucleation, or of ablation or incomplete tonsillectomy. But Moore states "that hæmorrhage is more likely to occur after enucleation by dissection than after enucleation with the guillotine appears to be the experience of most operators. In the latter case, a blunt guillotine causes compression and torsion of the vessels and tissues, hence the danger of hæmorrhage is lessened." [Statistics in proof of this statement are lacking, because dangerous hæmorrhage occurs in such a relatively small percentage of operated cases, that variations in skill or unavoidable factors upset deductions that figures may seem to warrant. Perhaps we are justified in admitting that lack of skill is more dangerous in dissection than in guillotine enucleation, since the submuscular vessels are more prone to injury in a badly performed dissection. Yet, on the other hand, of those who give preference to the guillotine, most claim that a blunt instrument is both more effectual and less liable to be followed by secondary hæmorrhage than a sharp instrument.—P. W.-W.]

Some very practical points must be abstracted from Moore's and Hill's papers. The sites of predilection of tonsillar hæmorrhage are at least five in number, tabulated by Hill thus :—

1. About the *centre* of the bed, where the larger branch or branches of the main tonsillar artery perforate the bed.

2. In the region of the *upper third* of the bed, where a branch of the descending palatine artery and vein sometimes cause trouble and require ligaturing; a procedure which is facilitated by using a tractor (Leslie Davis) to draw up the overhanging supratonsillar fold of the palate.

3 and 4. Vessels along the posterior surface of the anterior and along the anterior surface of the posterior pillars; and

5. In the *lower third* of the tonsil, where, in addition to an artery or arteries, a plexus of veins occasionally gives rise to a good deal of trouble until clamped and subsequently ligatured.

Moore adds to these the main vessels, viz., the ascending pharyngeal and the internal carotid, which in rare cases have been injured. His diagram is excellent, as well as a diagram he borrows from Fetterolf.⁵ (*See Plate XLIII.*)

Among causes predisposing to secondary hæmorrhage, Moore mentions local anæsthesia, e.g., cocaine combined with an astringent as adrenalin, and advises postponement of an operation on the tonsils during menstruation (for a week), and in acute inflammation of the tonsils (for three weeks at least), and states that postponement may be advisable in pernicious anæmia and acute leukemia, and in certain cardiac diseases, e.g., arteriosclerosis, nephritis. As contra-indications for operation he mentions hæmophilia, purpuric diseases, etc.

For controlling hæmorrhage Moore cites Citelli⁴ on the advantages of **Pituitary Extract**, and Kahn and Gordon's⁷ investigations in 50 cases, which led to the following conclusions: (1) The blood loss was greatly reduced; (2) The

PLATE XLIII.
POST-OPERATIVE HÆMORRHAGE AFTER TONSILLECTOMY.

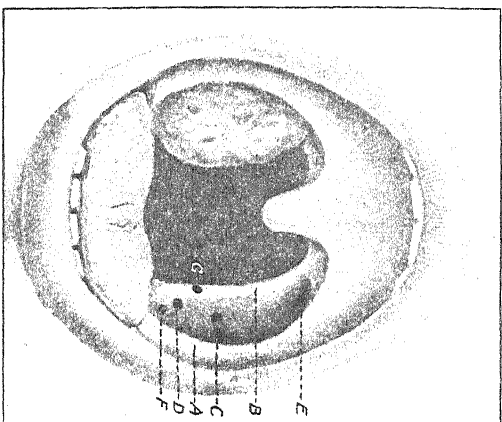


Fig. A.—Shows position of the favorite bleeding points after tonsillectomy. (A) The ascending palatine branch of the descending palatine branch of the facial artery. (B) The ascending palatine branch from the descending palatine of the ascending pharyngeal artery. (C) The tonsillar branch of the facial artery—one of the most common sites of hæmorrhage, i.e. the central portion of the tonsillar bed where this artery enters the tonsil. (D) The tonsillar plexus of veins at the inferior portion of the bed. (E) The tonsillar branch of the descending palatine branch of the ascending pharyngeal artery. (F) Tonsillar branches of dorsals lingue. (G) Tonsillar branch direct off the ascending pharyngeal, or from its descending palatine branch. The plica is not shown in the drawing.

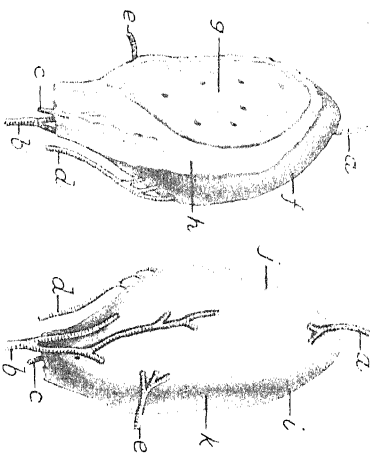
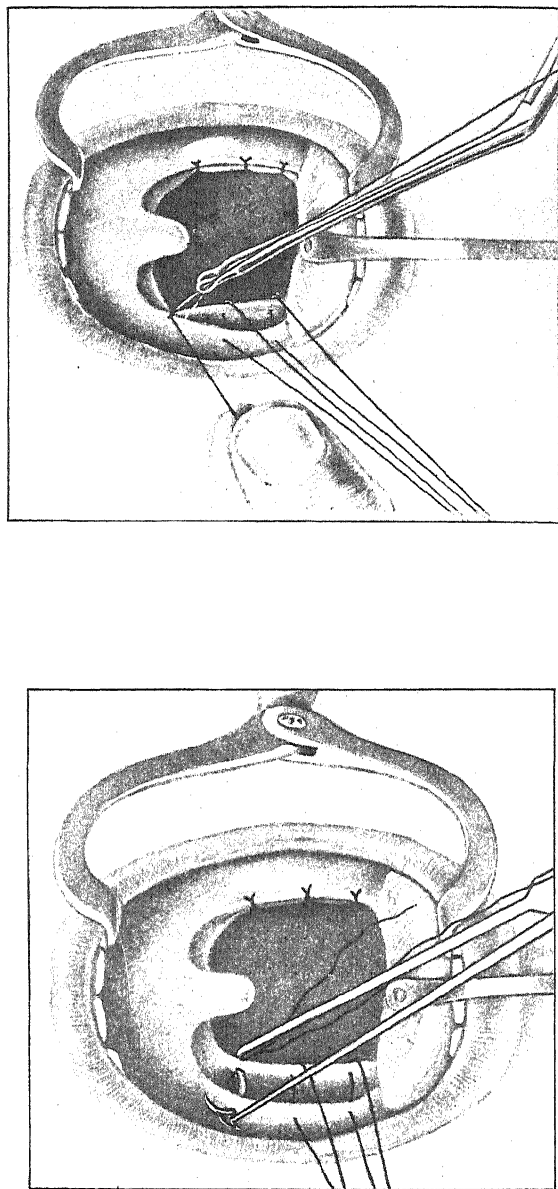


Fig. B.—The left tonsil, showing its arterial supply (after Petrovich). (a) Superior tonsillar branch from the descending palatine branch of the ascending pharyngeal artery. (b) Inferior tonsillar branch from the dorsals lingue; this capsule and outer wall, however, is independent of the ascending palatine. (c) Posterior tonsillar branch of the dorsals lingue. (d) Postero-inferior tonsillar—*the tonsilla*, branch of the tonsil. (e) Posterior tonsillar, a branch from the descending palatine of the ascending pharyngeal, and is severed during the separation of the tonsil from the posterior pillar. (f) Capsule. (g) Medial surface. (h) Annular plica. (i) Posterior surface. (j) Lateral surface. (k) Groove for pharyngo-palatine muscle.

PLATE XLIV.

POST-OPERATIVE HÆMORRHAGE AFTER TONSILLECTOMY—continued



Figs. C and D.—The arrest of hemorrhage after removal of the tonsils by temporary suturing of the faucal pillars. Shows Twinn's needle (threaded with a catgut suture) passed through the faucal pillars, also the method of securing and drawing the suture through the needle by means of a long hook.

coagulation time of the blood was reduced from one-third to one-half or more after a hypodermic of pituitrin in doses of 12 min. to children and 15 min. to adults; (3) The coagulation time was decreased within fifteen minutes, and it remained so for over twenty-four hours; (4) Pituitrin increases the strength of the heart-beat and decreases its frequency. It undoubtedly has a vaso-motor constricting effect as well as a coagulating effect. Pituitrin is advocated by Salinger⁸ also, both for tonsillar and nasal hæmorrhages.

Horse Serum and fresh **Blood Serum** have been used by Moore⁹ and found to possess a curative as well as a preventive value in the treatment of hæmophilic bleeding, purpura, and pernicious anæmia, by supplying a deficiency in fibrin ferment. Cecil Graham¹⁰ uses horse serum given by the mouth as a routine practice, and advises that 10 c.c. should be given in the evening before operation, and another 10 c.c. an hour after operation. In one case of hæmophilia with coagulation time of fifteen minutes, he reduced it to six minutes in eight weeks by means of horse serum and **Calcium Lactate**.

While recognizing the value of compression methods of arresting hæmorrhage, Moore favours early resort to temporary **Suturing** of the faucial pillars, and has devised a half-circular needle on a handle for introducing the ligatures, and a forceps for tying the ligature which overcomes the difficulty of doing so by introducing finger and thumb in the mouth. (*See Plate XLIV.*)

Laboure¹¹ has likewise emphasized the value of suturing a tampon compressor between the pillars of the fauces, and also of **Michel's Clips** in persistent hæmorrhage from the tonsils, and like Moore, resorts to **Serum** or **Calcium Chloride** as a preventive.

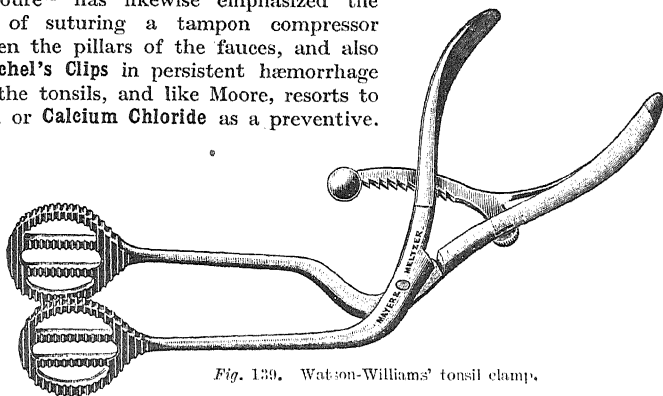


Fig. 139. Watson-Williams' tonsil clamp.

Hill¹² finds **Hæmostatic Forceps**, e.g., Watson-Williams' pattern, useful for immediate application in cases of bad secondary hæmorrhage, but not for long, as they are sometimes not tolerated by children. Then, under an anæsthetic in children, he favours **Ligature** of the bleeding vessels after seizure with forceps, and points out that the next day the patient's fauces are much more free from pain and swelling than after applying Michel's clips to the pillars, while a lateral pharyngeal abscess, deep to the superior constrictor, has been known to follow their insertion, and a nasty septic sequela is not uncommon. He says that some of these objections apply equally to sewing up the pillars with a silk or catgut ligature by Irwin Moore's or other similar methods. Suturing, says Hill, should be a *dernier ressort*. He cites and illustrates Leslie Davis's method of applying ligatures to the bleeding areas.

Watson-Williams has used his **Tonsil Clamps** in all cases of severe tonsillar hæmorrhage in his practice for many years, and has never found them fail. In very severe cases—e.g., where an adult patient had vomited and lost 80 oz. of blood after the primary hæmorrhage—they have been left on twelve to sixteen

hours without difficulty, especially if small doses of morphine are given hypodermically so as to avoid any possible additional loss of blood before the blood-pressure has been somewhat restored. In such conditions a general anæsthetic would be dangerous, and the further loss of blood during the more prolonged method of ligaturing the pillars would be a grave consideration; whereas the tonsil clamps can be applied in two seconds by a trained nurse who knows how to use them, without awaiting the surgeon's arrival—sometimes an overwhelming advantage. He therefore always carries two clamps, so that in cases of severe hæmorrhage it becomes an easy matter to determine whether the hæmorrhage is from both sides or one only, and if the latter, which tonsil area is bleeding. Even when all bleeding has ceased, a tonsil clamp is invariably left with the nurse in case of necessity, though, of course, it is very rarely required.

Elphick's **Hæmostatic Guillotine** with a crushing blade which is first driven home so as to enucleate the tonsil without detaching the 'crushed' tissues of the base, which are then divided by the descent of the sharp second blade on the median surface of the first blade, has long been advocated, and is illustrated by Hill; La Force also has devised a similar two-bladed hæmostatic guillotine, while Braun and also Sluder have combined a snare and guillotine. More recently, Winslow¹³ has described Beaman Douglas's modified Sluder instrument, which does not appear to differ materially from Elphick's, with which Winslow apparently is unacquainted.

Voice Impairment resulting from Tonsillectomy, and its Causes.—The result of a study of 30 cases of voice impairment or other disturbances due to tonsillectomy is communicated by Kenyon,¹⁴ the defects being attributed in part to the removal of the capsule, and in some also to traumatism of the faucial pillars. He considers that the opinion of French, that 80 per cent of tonsils could as well be operated on without extreme radicalism, is probably true; that the tonsillar capsule should be preserved undisturbed if possible; and that such an operation could practically always be employed in singers.

Causes of Operative Failure.—Davis,¹⁵ in his survey of 1064 operations for the complete removal of tonsils and adenoids, states that the first of the common causes of the recurrent operation is tonsillotomy, and cites cases to the point. He considers that the most satisfactory and surest method of performing tonsillectomy is that of 'dissection' as described by Waugh. The second cause of failure is inexperience of the operator. The third cause is due to untreated anterior nasal obstruction, causing the child to show symptoms and signs of adenoid growths which are non-existent.

Tonsillectomy under Local Anæsthesia.—Oscar Wilkinson,¹⁶ reporting 200 consecutive cases, states that just before the operation the patient is given a hypodermic of $\frac{1}{2}$ gr. of **Codaine Sulphate**, with, in certain cases, $\frac{1}{60}$ gr. of **Atropine Sulphate**. In the after-care of the patient, those who complain of *pain* are given an ice-pack around the neck, and some demand another injection of codeine, or codeine by the mouth. In nervous subjects he has found that one or two doses of **Bromide of Potash** have a good effect. A *hæmorrhage* within seventy hours may be considered primary. In this series of 200 cases there were four primary hæmorrhages, but it was necessary in only one case to ligate the bleeding vessel. There were three cases of secondary hæmorrhage, and in only one case was it necessary to sew up the tonsil cavity. Another complication is *neuralgia of the throat*. Within a few weeks after operation the patients return complaining of pain at the lower anterior portion of the tonsil scar. This is due to the involvement of a tonsillar branch of the glossopharyngeal nerve in the scar. Injury to the main portion of the glossopharyngeal nerve might occur in this region. The patient suffers for a long time, if not indefinitely, from a severe dryness of the throat, and fatigue after singing or speaking.

Operative Technique in Circumcision of the Tonsil.—Murphy¹⁷ holds that in normal tonsils the plica triangularis has practically disappeared before birth, and that the mucous glands of the faucial region rarely become infected when the plica has shrunk to normal. Where there is a persistent plica, neither the tonsillar crypts nor the peritonsillar spaces drain normally. Murphy gives three excellent diagrams showing the technique of his operation of removal of the plica triangularis. He says that in the normal tonsil, and in those where the circumcision operation has been properly carried out, the tonsil should be easily forced between the pillars by the superior constrictor muscle when the patient retches or gags, and during deglutition. When there is a persistent plica, the anterior and superior fossæ become culture beds for pathogenic bacteria which infect the mucous glands, and the anterior pillars ride the tonsil in deglutition, preventing drainage of the crypts.

Primary Jugular Thrombosis due to Tonsil Infection.—Goodman¹⁸ records the case of a female, age 35, who had had follicular tonsillitis for ten days. Five days before admission she had had two or three chills, followed by profuse perspiration, with vomiting. A tender swelling was noticed on the left side of her neck. Upon admission she had a severe chill, which was followed by a rise of temperature to 107.2°. The patient became delirious. Blood culture proved negative. There was an induration extending along the anterior border of the sterno-cleido-mastoid on the left side. The internal jugular vein was exposed, and was found to be surrounded by considerable infiltration of the tissues. The vein was ligated near the clavicle. Thrombosis was situated at and included part of the facial tributary. The vein was resected to the jugular foramen. Temperature was normal on the fifth day. The sigmoid sinus was not exposed. The interesting features of this case are the direct infection of the jugular by the lymphatic route from the tonsils and the pharynx instead of the usual primary involvement of the sinus and a secondary extension to the jugular as a complication of mastoiditis.

Tonsils as a Source of Systemic Infections.—Bardes¹⁹ states that he has enucleated the tonsils of some two hundred patients for *rheumatism* and kindred disorders, and that nearly all were benefited by the operation. He lays emphasis on the importance of the removal of every infectable pocket by enucleation, instead of a less complete removal by tonsillotomy. Two cases of cure of *multiple arthritis* following enucleation of the tonsils are recorded by Dabney²⁰ *Choroiditis* and *choroido-retinitis* clearing up after tonsillar enucleation in three cases are also recorded by Dabney,²¹ a fact worthy of note.

Layman²² reports his results from a collective investigation which yielded valuable information as to the influence of diseased tonsils in various systemic infective diseases and the beneficial results of their enucleation. Taking three groups which he reports in percentage results, we find—

			Arthritic Cases.	Cardiovascular Cases.	Renal Cases.
Cured	..	..	68 per cent	36 per cent	81 per cent
Improved	..	..	20 "	18 "	5 "
Not improved	..	..	12 "	46 "	14 "
Worse	..	..	10 "	—	—

Sarcoma of the Tonsil.—Three cases recorded by Guthrie²³ serve to prove the favourable result that may be obtained by simple **Enucleation**. One case was too advanced, as it had spread beyond the capsule; but the other two

had remained free from recurrence after enucleation. When reporting five years' later—and in each of these a large round-celled sarcoma had occurred in adults. His analysis of 75 cases of recorded and microscopically proved sarcoma shows the age incidence thus :—

Age	1-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Cases	2	7	7	13	10	23	6	6	1

In other words, there were 16 before 30, and 46 between 30 and 60. Of the 75, 25 were females and 50 males. Of 33 operated cases traced subsequently, only 10 remained free from recurrence, but only 6 survived a year or more.

Primary Tuberculosis of the Tonsils.—Mitchell's²¹ research to ascertain the frequency of primary tuberculosis of the faucial tonsils, and its connection with other tuberculous affections, goes far to clear up these vexed questions, which have great practical importance. After reviewing the work of previous investigators, Mitchell gives in fair detail his technique and clinical data, on which he bases the following conclusions :—

Group A.—One hundred and six cases of tonsils removed in cases of tuberculous glands, 100 children, 6 adults.—From mere inspection by the mouth a diagnosis of a tuberculous tonsil cannot be made ; in none of his cases was Mitchell led to suspect tubercle either on examination of the throat or from naked-eye inspection of the removed tonsils. The presence of a tuberculous tonsil can be suspected clinically only by its effects, namely, infection of the tonsillar lymphatic glands. The size and shape of the tonsil do not seem to have any special relation to the tuberculous infection. In the majority of cases the tonsil shows little enlargement for a considerable time ; in 51 cases the tonsils were small and submerged, in 27 they were hypertrophied, in 28 they were of medium size. In none was there any external evidence of tuberculosis of the tonsils. As regards the degree of glandular enlargement, in 80 cases this was slight ; in the remaining 26 cases there was extensive glandular affection of the cervical glands.

Microscopical examination proved that in 38 per cent of these cases the tonsils were tuberculous. The inoculation test was applied to the tonsils in 92 of the cases, with positive results in 20 cases (20 per cent), the bovine bacillus in 16 and the human in 4 cases.

Group B.—Hypertrophied tonsils removed from 100 children.—In all cases the lymph-glands behind the angle of the jaw were palpably enlarged ; the enlargement was probably of a toxic nature, and not due to true tuberculous infection. As in *Group A*, none of the tonsils showed any naked-eye evidence of tuberculosis. Microscopical examination proved that in 9 per cent of these cases the tonsils were tuberculous. Inoculation of guinea-pig test was applied to these 100 cases, and 9 yielded positive results, bovine in 4, human in 2, and undetermined in 3. In not a single case of bovine tonsillar tuberculosis was there a history of pulmonary tuberculosis in other members of the household. In 12 cases one or more of the children were or had been affected with other forms of tubercle, but clinical examination failed to reveal pulmonary tuberculosis in any of the children or adults whose tonsils had been investigated.

The author recently investigated the prevalence of tubercle bacilli in the Edinburgh milk supply ; in 406 samples of mixed milk collected from 406 milk shops, 82 samples (20 per cent) contained tubercle bacilli. He points out that in Scotland it is the exception and not the rule to sterilize cow's milk, and he attributes the tonsillar infections with tubercle mainly to drinking infected milk. Mitchell concludes as follows :—

1. Tuberculosis of the upper deep cervical glands develops from a primary focus in the faucial tonsils much more frequently than is generally supposed.

2. Primary tuberculosis of the faucial tonsils can be recognized only by the aid of the microscope and by inoculation experiments. The lesions are found in certain localities, namely, immediately under the surface epithelium and near the mouth of the lacunæ, in relation to the deeper portions of crypts, or deep in the tonsil close to the capsule. The first-mentioned site supplied the greatest number of examples.

3. Hypertrophied faucial tonsils are the seat of primary tuberculosis, though rarely as compared with tonsils from cases of tuberculous cervical adenitis.

4. The experimental results indicate that in Scotland, at any rate, primary tuberculosis of the faucial tonsils in children must be attributed to the drinking of milk from tuberculous cows, rather than to the inhalation of human tubercle bacilli conveyed by dried sputum or the moist spray from the coughing of a consumptive patient.

5. Bovine and human types of tubercle bacilli are present in the tonsillar crypts of a small percentage of children without demonstrable tuberculous lesions either in the tonsils or elsewhere.

6. Tonsillectomy is essential in all cases of tuberculous cervical adenitis in children.

7. The prognosis is very slightly influenced in children in whom the faucial tonsils and cervical glands are simultaneously affected with tuberculosis.

8. The difficulties associated with the reform of the milk supply and the lengthened period which must elapse before it becomes possible to obtain a tubercle-free milk demand some means of rendering milk safe. The only immediate safeguard is in the sterilization by boiling of milk for the artificial feeding of infants and the nourishment of all children.

Tonsillectomy in the Tuberculous.—Dennis²⁵ has collected 34 cases, but has only observed the patients after operation in 22 instances. Of the latter, the results are distinctly good in 17, poor in 3, and of no effect in 1. Five of the patients had laryngeal tuberculosis, one tuberculosis of the pharynx, and one middle-ear tuberculosis. Ether was the anæsthetic in five cases, local anæsthesia being used in the others. Two of the five 'ether' cases did badly afterwards. Dennis holds that a time should be chosen for operation when the general condition is favourable and the lungs are relatively quiescent. The post-operative care of the wound is important. *Tincture of Iodine* should be applied once or twice daily until cicatrization is complete. The indications for operation are practically the same as for non-tuberculous cases.

The Lingual Tonsil: General Consideration, and its Neglect.—Cohen,²⁶ in discussing this subject, states that the number of nodules averages 66. The size varies from $\frac{1}{2}$ to 6 mm. They rest on a basement membrane of fibrous tissue analogous to the capsule of the faucial tonsils. The lymphatic drainage empties into the suprahyoid glands and the submaxillary and deep cervical glands. The two portions of the tongue have different origins, the sulcus terminalis being taken as the division between the oroglossus and the pharyngoglossus. The part behind—the pharyngoglossus—contains the lingual tonsil. The lingual tonsil is the last of the tonsils to undergo atrophy.

Diseases of the lingual tonsil are similar to those of the faucial tonsil, but usually of milder form. *Superficial varices* only make their appearance when the deep varices have acquired a certain development. The trunk of the lingual nerve, the evident seat of glossodynia, is accompanied by a satellite vein. All neuroses in this situation may be attributed to superficial and deep varices. Browne believes that a constitutional or acquired debility of the vasomotor system is the chief cause. Some cases occur at the menopause. Other etiological factors are constipation, hepatic cirrhosis, and chronic intestinal disturbance. The symptoms are cough, foreign-body sensation, voice

changes, paresthesia, hemorrhage and respiratory distress, constant pain at the root of the tongue, pain on swallowing referred to the base of the tongue and region of the hyoid bone. The neurotic element is highly demonstrated in those individuals. *Globus hystericus* is frequently due to some lesion of the lingual tonsil. Casadesus reported a case of *nocturnal asthma* cured by the cautery applied to the lingual tonsil. The *barking cough of puberty* is a frequent occurrence due to slight enlargement of this tonsil. This constant, irritating cough is sufficient to cause impairment of health and give our patient great mental anxiety from his belief that he has tuberculosis. Where the *persistent cough of pregnancy* cannot be explained, it would be well always to look for hypertrophy of the lingual tonsil. Twenty-five per cent of the pathological changes in the lingual tonsil occur in professional voice-users. *Marked hyperplasia* occurs in middle or adult life, but is seldom seen in children. It is more common in the female. Varicose conditions have been found to be more common in the male sex.

TREATMENT.—General treatment consists in the **Removal of Alcohol, Tobacco, and Irritating or Hot Foods.** For varix, **Silver Nitrate**, from 12½ to 25 per cent. This drug or the cautery should be tried in slight hypertrophic conditions. A mixture which Cohen uses is—**Tincture of Iodine 1 dr., Glycerotannin 1 oz.** After a course of treatment two or three times weekly, with little or no improvement, we should consider operation. A large pair of curved scissors may be used, but Cohen prefers the lingual tonsillotome; for varicose conditions the galvano-cautery is best. For after-treatment, equal parts of **Glycerin, Tincture of Iodine, and Tincture of Chloride of Iron** at intervals of twenty-four hours are employed.

Cohen describes several cases. One, a male, age 32, had an attack of tonsillitis ten days before Cohen saw him. He was directed to use gargles, but received no benefit from their use. He began to have painful dysphagia. The condition annoyed him so much that he was tempted to end his life. Examination revealed swollen posterior portion of the tongue, diseased tonsils, and œdema of the epiglottis. Under cocaine anæsthesia Cohen made several scarifications in the glosso-epiglottic space, followed by a deep incision of the left lingual tonsil. Pus at once oozed out.

In 3000 cases, 55 showed abnormal conditions of the lingual tonsil; 37 were females and 18 were males; 22 per cent were under twenty years of age, 29 per cent between twenty and thirty, and 49 per cent were thirty and above.

Sluder²⁷ refers to the enlargement of this tonsil as a trouble in singers, causing them to sing sharp or flat, and affecting the durability of the voice. He also alludes to the lingual tonsil as a factor in thyroid-gland disturbances, and relates that in one of his own children the right lobe of the thyroid swelled as an accompaniment of an acute follicular lingual tonsillitis; it behaved like the glands in the neck with faucial tonsillitis, both becoming normal again in ten days. He says that in cases of thyroid enlargement of moderate grades of almost any duration, it has proved helpful to treat the lingual tonsil even though it appear normal, though as a matter of fact it very seldom has appeared normal. He makes small applications of **Silver Nitrate** (saturated solution) to the lingual tonsil two or three times a week. He also finds that the lingual tonsil seems to play a causative part in 'glossodynia.' For enlargement of the tonsil, **Ablation** serves as the best treatment.

REFERENCES.—¹*Laryngoscope*, 1918, June; ²*N. Y. Med. Jour.* 1917, ii, 1001; ³*Pract.* 1918, April, 334; ⁴*Ibid.* 301; ⁵*Amer. Jour. Med. Sci.* cxliv, 51; ⁶*Trans. Internat. Med. Congress*, London, 1913, xv, xvi, 283; ⁷*Ann. Otol. Rhinol. and Laryngol.* 1915, xxiv; ⁸*Ther. Gaz.* 1918, Jan. 15, 16; ⁹*Loc. cit.*; ¹⁰Verbally communicated to Irwin Moore; ¹¹*Presse Méd.* 1918, June 10, 296; ¹²*Loc. cit.*; ¹³*N. Y. Med. Jour.* 1918, i, 1077; ¹⁴*Jour. Amer. Med. Assoc.* 1917, Sept. 1; ¹⁵*Brit. Med. Jour.* 1918, i, 114; ¹⁶*Laryngoscope*,

1917, Sept., 667; ¹⁷*Ibid.* 672; ¹⁸*Ann. Otol. Rhinol. and Laryngol.* 1917, June, 527; ¹⁹*Med. Rec.* 1917, Sept. 1; ²⁰*Laryngoscope*, 1918, June, 479; ²¹*Ibid.*; ²²*Ibid.* Feb., 65; ²³*Jour. Laryngol. Rhinol. and Otol.* 1918, Oct.; ²⁴*Ibid.* Jan. and Feb.; ²⁵*Laryngoscope*, 1917, Nov., 805; ²⁶*Ibid.* Sept., 691; ²⁷*Amer. Jour. Med. Sci.* 1918, Aug., 248.

TOXÆMIA, ALIMENTARY.

Robert Hutchison, M.D., F.R.C.P.

Arnold Jones¹ lays stress upon the fact that many cases of alimentary toxæmia are directly obstructive in origin, and that a careful examination will elicit both the cause of the obstruction and the steps necessary to effect a cure. He describes three cases in illustration, all in women. The first, a patient, age 32, had for long suffered from pain and stiffness in all the joints. Constipation was obstinate. Pelvic examination revealed a retroverted uterus almost completely obliterating the bowel. The displacement was corrected by operation, and a few months later all her symptoms had disappeared. The author believes that retroversion of the uterus is a frequent cause of obstructive alimentary toxæmia. The second patient, 49 years of age, suffered from persistent constipation, with occasional obstructive attacks. She had rheumatoid arthritis, with stiffness, pain, and swelling of the fingers and knees. There were pronounced symptoms of neurasthenia. She had had an attack of puerperal sepsis thirteen years previously, and had never been well since. Rectal examination revealed a band constricting the rectum, removal of which by operation was followed by complete restoration to health. The third patient, age 39, complained of pains all over, general weakness and great mental depression, with phobias of various sorts. There was tenderness and thickening in the ileocæcal region. On opening the abdomen the ileocæcal junction was found buried in adhesions, the last nine inches of the ileum being distended. After an ileosigmoidostomy all the symptoms disappeared, and in three months she declared herself a 'new woman.'

Ramirez and Hogue² and Kellogg,³ on the other hand, attribute many cases of alimentary toxæmia to insufficiency of the ileocæcal valve, which allows a regurgitation of the contents of the cæcum into the ileum. The insufficiency of the valve usually results from chronic inflammation in the neighbourhood of the cæcum, about 90 per cent of all cases being found in patients who either have a chronic appendicitis or have undergone a laparotomy, which has led to adhesions producing obstruction in the pelvic or iliac colon. The most characteristic symptoms of ileocæcal insufficiency, according to these authors, are burning pain in the right iliac fossa, alternating periods of diarrhoea and constipation, headaches, lassitude, and arthritic manifestations. The existence of incompetence of the valve can be demonstrated by x-ray examination after a barium enema. The most satisfactory medical treatment consists in general hygienic, dietetic, and tonic treatment, but in many cases surgical intervention is necessary to restore the valve. The technique of the operation is described by Ramirez and Hogue², but they admit that sufficient time has not yet elapsed to enable them to say whether the restoration of function in the valve is permanent.

REFERENCES.—¹*Glasgow Med. Jour.* 1918, Jan., 22; ²*N. Y. Med. Jour.* 1918, ii, 146; ³*Med. Rec.* 1917, ii, 399.

TRENCH FEVER.

E. W. Goodall, M.D.

During the past twelve months much work has been done towards the establishment of the symptomatology and the elucidation of the etiology of this disease, principally by two committees: the War Office Trench Fever Committee, whose investigations were carried out at Hampstead, and a committee of the American Red Cross, in France. The account which follows is derived almost entirely from the reports published by these committees,

British¹ and American.² References to previously published papers will be found in both these reports. The American report deals almost entirely with experimentally-produced cases, while in the British report the results of investigation of both experimental and natural cases are recorded.

Trench fever began to be recognized first in the great war in the British Army in Flanders and Northern France in the latter part of the year 1915, and thereafter continued to increase in frequency to such a degree that the morbidity resulting from it on the Western front exceeded that from any other disease. Subsequently it occurred amongst Allied troops in Salonica, Mesopotamia, and Italy, and isolated cases have been found even in England, where recent cases have been recorded by J. H. E. Brock³ and F. H. Mosse.⁴ It was also met with amongst the armies of the enemies on both Western and Eastern fronts. It has been known by a variety of names, derived in some instances from the locality, and in others from certain of the prominent symptoms. It is exceedingly probable that it is not a new disease, but has occurred under the conditions brought about by warfare in days gone by, and it is possibly an affection of some antiquity. The largest number of cases occur in the cold weather.

ETIOLOGY.—There can be no doubt now that the virus of this disease is conveyed from a person suffering from it to a healthy person by means of lice. This fact has been settled by experiments on healthy persons who patriotically volunteered for the purpose, carried out by both the committees mentioned above. The experiments consisted chiefly in causing these persons to be bitten by lice which had been feeding on patients suffering from trench fever; by scarifying the skin of healthy persons and rubbing crushed lice and the excreta of lice into the scarifications, and by injecting intravenously into healthy persons the blood or blood serum taken from affected patients. Certain other experiments were also carried out. The results have been summarized by the British Committee as follows. In some instances they differ from those of the American Committee, whose conclusions are noted below in brackets.

1. The whole blood from febrile trench fever cases, up to the fifty-first day of the disease, when injected intravenously, is capable of reproducing the disease. The incubation period in such infections varies greatly—from five to twenty days.

[The virus is present particularly in the plasma of the blood of trench-fever cases, and such plasma will produce the disease on inoculation into healthy persons.]

2. The virus as contained in the circulating blood is destroyed by adding distilled water in large quantities.

3. The bites alone of infective lice do not produce trench fever.

[The louse may transmit the disease by its bite alone, the usual manner of infection.]

4. The excreta of infective lice when applied to a broken surface of skin do readily produce trench fever. The incubation period of such infections is remarkably constant, and averages eight days.

5. The excreta passed by lice fed on trench-fever patients are not infective till the expiration of not less than seven days from the commencement of the feeding on trench-fever blood, thus indicating a developmental cycle in the louse, or a period during which the organism multiplies.

6. Once lice are infective they remain so till at least the twenty-third day from the date of their infection.

7. The virus of trench fever, as contained in infected louse excreta, is capable of withstanding drying at room temperature, exposure to sunlight, keeping for not less than sixteen days, and heating to 56° C. for twenty minutes.

8. A temperature of 80° C. for ten minutes destroys the virus, which is therefore not a spore-bearing organism.

[The virus is destroyed at a temperature between 70° and 80° C.]

9. The bodies of infected lice when crushed on the broken skin are capable of producing trench fever. When lice become so infective remains to be determined.

[A man may be entirely free from lice at the time he develops trench fever,

the louse that infected him having left him some time previously as its host; and the louse need only remain upon the individual for a short period of time in order to infect him.]

10. Active trench-fever blood equivalent to the contacts of eleven lice does not produce trench fever when rubbed into the broken skin.

11. Infection probably does not take place by the mouth or by inhalation.

12. The excreta of lice are not normally capable of producing trench fever.

13. Trench-fever-infected lice do not transmit the disease to their offspring.

14. Some attacks of trench fever may be afebrile throughout.

15. The percentage of individuals naturally immune to trench fever is exceedingly small.

16. Old age is no bar to infection.

17. Such immunity as results from an attack of trench fever is not permanent, and may persist only for so long as the individual shows evidence of the disease.

18. Even as late as the seventy-ninth day of disease a patient's blood may remain infective and be capable of infecting lice fed on such a patient while febrile.

19. The different varieties of trench fever result from differences in the persons infected rather than in the source of infection.

The American Committee came to the following additional conclusions:—

The organism causing the disease is a resistant, filterable virus.

The virus of trench fever is also sometimes present in the urine of trench-fever cases, and occasionally in the sputum, and the disease may be produced in man by the introduction of the virus in the urine or sputum through the scarified or otherwise abraded skin.

SYMPTOMATOLOGY.—*Incubation period.* This varies from fourteen to thirty days in cases contracted in the natural way; in experimental cases, especially when the virus is introduced in large amount, it may be as short as five days.

Occasionally, in the experimental cases, slight symptoms have been noticed during the incubation period, before the onset of the febrile attack, viz., slight headache, malaise, pains in bones and muscles; these symptoms may be periodic; in a few cases the pulse-rate was increased; very occasionally there is slight conjunctival injection (pink-eye).

The *initial symptoms* come on very suddenly in rather more than half the cases; they are, in the order of frequency, pain in the head, usually severe and frontal; pain in the shins, loins, knees, ankles, thighs, or calves; shivering and chilliness; sweating; frequent micturition; dizziness; nausea and vomiting; pain in shoulders and arms; pain in abdomen; diarrhoea. The frequency of these symptoms of onset vary from 74 per cent in the case of headache to 5 per cent in the case of diarrhoea. It will be found on examination that the temperature is usually raised (between 102° and 104°), and with it the pulse-rate. In about a quarter of the cases the spleen is slightly enlarged at this stage.

COURSE OF THE DISEASE.—The symptoms just mentioned increase in severity within a few hours up to forty-eight, and others are added. The *headache* is felt most often across the forehead and behind the eyes. There may be extreme *prostration*, even within an hour or two. The *conjunctivæ* are slightly injected (pink-eye). The *spleen* becomes enlarged, and can be felt one or two fingers' breadths below the ribs; it is usually firm and well defined; there is tenderness in the spleen and splenic area; occasionally the muscles in this region are rigid. *Sweating*, often profuse, especially at night, is often observed; it may alternate with a sensation of *chilliness*, but pronounced rigors are not common. According to American observers, in experimental cases *nystagmus* (not spontaneous) is common; the British Committee places this symptom amongst the curiosities of symptoms; but Horsley Drummond⁵ appears to have observed it in a number of cases.

Pain in the shins is often a prominent symptom; it may be severe and shooting or continuous; besides pain there may be *tenderness* of the shins.

Pains are also frequently felt in the other limbs and various parts of the body, or 'all over.' While *general* pains are frequent early in the attack, they disappear later, but *local* pain persists, especially in the loins and lower extremities; usually these pains are symmetrical. These various pains are prone to be worse at night. Various *joints* may also be the seat of pain, especially the knees; but swelling is very rare.

According to the American Committee an *erythematous rash* is frequently present—70 or 80 per cent of the cases. H. Drummond speaks of it as 'characteristic,' and states that it is found in about 30 per cent of relapsing cases, but the report of the British Committee does not mention it. It consists of red macules, from 2 mm. to 1 cm. in diameter. They disappear on pressure and do not become hæmorrhagic; the edge is not well defined; the spots are not palpable. Each spot lasts from twelve to thirty hours. Their favourite site is the chest and abdomen, but the whole trunk may be invaded by them. They rarely occur on the limbs, and never on the face. They are to be seen during the febrile periods. Their number varies from one or two to several hundreds.

The *urine* is increased in quantity, especially towards the end of a febrile period, so that micturition is frequent; occasionally there is albuminuria.

The *pulse-rate* rises and falls with the temperature, but is rarely excessive during the early stages. The blood shows a moderate but variable amount of *leucocytosis*. According to H. W. Perkins and R. H. Urwick,⁶ there is a marked rise of leucocytes of all three kinds (polymorphs, lymphocytes, and large mononuclears) during the febrile period, and a gradual relative rise of lymphocytes during convalescence. Special *nervous symptoms* (beyond those already mentioned) are rare; the reflexes are generally brisk; but *areas of tenderness*, associated with the various pains mentioned above, are frequently to be detected. D. W. Carmalt-Jones⁷ has found that these hyperalgesic areas correspond in trench fever especially with three segments of the spinal cord, viz., eighth cervical and first dorsal; the seventh dorsal; and the first, second, third, fourth, and fifth lumbar. This he calls the 'full trench-fever distribution,' and states that it is found frequently in its entirety.

Temperature.—Trench fever is essentially a relapsing disease; but its course is very variable. According to the British Committee there are two forms of fever which occur in different stages of the disease. The first form is an irregular remittent and intermittent fever lasting for a period which rarely exceeds four weeks. The second is a definitely intermittent fever, often showing a regular periodicity, and sometimes extending over a period of many weeks. The second form is invariably preceded by the first; but the initial attack may be very mild and may pass unrecognized. Three types of curve are seen in the temperature charts of the initial (first) form of fever: (1) A pyrexial period of about three days: possibly it would be found that remissions occur if sufficiently frequent observations were made. (2) A similar febrile period, followed by an afebrile period of five to seven days; on the sixth to eighth day another febrile period begins, lasting one to three days. Afterwards there may be a succession of afebrile intervals and febrile periods (relapses). (3) A continuance, more or less complete, of the original febrile period into the relapse, constituting what has been termed the 'saddle-back' type of chart. In these cases a prolonged period of irregular fever often follows.

The second form of fever occurs late in the disease, at shorter or longer intervals after the initial attack. There are rises of temperature, often up to 104°, lasting a day or two, and occurring at irregular intervals; but the intervals may be very regular in length, usually of about four days, so that the relapses occur periodically.

Commonly there are four or five *relapses*, which are of varying duration. The disease frequently lasts several weeks, up to six, and may continue longer than that. The first relapse may occur several weeks after the primary attack. The total of the febrile periods occurring during the course of the disease is usually eight to fifteen days.

According to the British Committee there is no constant correlation between the fever curve and the clinical course in either natural or experimental cases.

Not infrequently there is no rise of temperature during the relapse, which is recognized by the return of certain of the other symptoms—headache, pains in limbs or back, accelerated pulse-rate, sweating at night, etc. Neither periodic fever nor pain in the shins is necessarily present. Relapses may be due to reinfection, but they may also undoubtedly be due to a persistence of infection without reinfection. Not infrequently relapses are more severe than the primary attack.

Trench fever is never fatal; but not infrequently it is followed by a *chronic morbid condition*, of which the principal symptoms are as follows, according to the British Committee: exhaustion, giddiness and fainting, headache, breathlessness on exertion, aches and pains in various parts of the body and limbs, irritability, lassitude, sweating, coldness of the extremities, palpitation and cardiac irregularity, fever. These symptoms are given in the order of their importance. Speaking broadly, it may be said that the chronic cases fall into three main groups: (1) Cases of disordered action of the heart; (2) Cases with neurasthenic symptoms; (3) Rheumatic cases. The chronic disease may last for months, and for upwards of a year. Considerable anæmia and loss of weight may take place.

PATHOLOGY.—According to the American Committee, the virus of trench fever is filterable. What the nature of the virus is has not yet been shown; but J. A. Arkwright, A. Bacot, and F. M. Duncan⁸ have brought forward some evidence in favour of its being a rickettsia body. Small bodies resembling diplococci or bipolar bacilli were described in the blood of patients and in the infecting insect in Rocky-Mountain spotted fever by Ricketts in 1909, in typhus fever by Ricketts and Wilder in 1910, and in trench fever by Töpfer in 1916. To the bodies occurring in connection with typhus, da Rocha-Lima gave the name of *Rickettsia prowazeki* in 1916. The bodies found in lice believed to be uninfected, or from trench-fever patients, he called *R. pediculi*. These bodies are very small—0.3 by 0.3 to 1.5 micron—are non-motile, and are best demonstrated by staining for sixteen to twenty hours with weak Giemsa stain (1 drop per c.c.). They are very scanty and difficult to recognize in blood-films of patients, but occur in great numbers in the intestinal canal of the louse, and sometimes elsewhere in the insect, which acts as an invertebrate host. The observers mentioned above made a number of experiments with lice in connection with the work of the British committee at Hampstead, and came to the following conclusions:—

1. Rickettsia bodies were constantly present, after a suitable lapse of time, in lice which had been fed on a trench-fever patient.
2. The bodies were absent from lice bred in captivity and fed only on healthy men.
3. There was a very close correlation between the presence of rickettsia bodies in lice or the excreta of lice, and the virulence of those materials when inoculated into men.

DIAGNOSIS.—The disease is most likely to be mistaken for influenza, typhoid and paratyphoid fever (enteric fever), malaria, typhus fever, relapsing fever, spirochætosis hæmorrhagica, and cerebrospinal fever. In *influenza*, symptoms of catarrh of the respiratory tract are very commonly present, whereas they

are absent from trench fever. A rash is seldom met with in influenza, and even when present it is not like that of trench fever. From *typhoid* and *paratyphoid* fever the diagnosis can usually be made by the course which the disease runs, and the serum and bacteriological tests in uninoculated persons. In those who have been inoculated against these infections, the diagnosis may not at first be easy, because the evidence derived from serum tests is not to be relied on unless the tests are repeated over a series of days. The rash of trench fever, if scanty, closely resembles that of typhoid and paratyphoid. The occurrence of more than one relapse would usually negative these diseases, and even in inoculated persons the primary fever is usually of longer duration than in trench fever. The pains in the loins and lower extremities, nystagmus, and pink-eye, are not met with in enteric.

From *malaria* the disease can usually be distinguished by the absence of the parasite. In *typhus* the febrile period is usually of thirteen or fourteen days' duration, and is seldom shorter than seven. The rash comes out on the fourth day, affects the extremities, and becomes petechial. Only those cases of trench fever in which pains in the neck as well as in the head are pronounced are likely to be mistaken for *cerebrospinal fever*; an examination of the cerebrospinal fluid for the meningococcus will usually settle the diagnosis.

In *relapsing fever* the primary fever is of several days' duration and terminates by crisis. There is only one relapse. The characteristic causative organism is found in the blood during the primary fever and the relapse. There is no constant rash. The onset of *spirochaetosis hæmorrhagica* may closely resemble that of trench fever. In *spirochaetosis*, hæmorrhage from the nose, lungs, stomach, and bowel are frequent; so also is herpes labialis. Often hæmorrhagic jaundice appears on the fourth and fifth day. The spirochaetes will be found in the urine about the ninth day.

PROGNOSIS.—Trench fever, though never fatal, may give rise to the morbid conditions previously mentioned which may endure for months and possibly years. According to the British Committee, about 90 per cent of all cases yield quickly to ordinary symptomatic treatment and return to duty in a few weeks. It is probable, however, that some of these patients subsequently relapse, though how many is not known. The remaining 10 per cent are invalided home. The committee give an analysis of 236 cases of this class which came under treatment at the military hospital at Hampstead, from which it appears that 7.2 per cent were discharged after several months' treatment as being permanently unfit for further service of any kind. Only 6.2 per cent left the hospital free from any symptoms. The remaining patients were sent to convalescent hospitals, or command depots, or to home service. The best guides to prognosis are the physical fitness of the man when he is seized by the disease, a definitely palpable spleen, and the development in the second or third week of a low, irregular type of fever. In all such cases the course of the disease is likely to be tedious, and the patient seldom recovers sufficiently to resume general duty; most of them, indeed, are invalided from the service. The committee state that

Neither the intensity, the seat or the character of the pain, the height of the initial temperature or its duration, nor the suddenness or otherwise of the onset, give any indication of the future course of the disease. The patient's weight is the best guide to prognosis in a chronic case. As recovery takes place, the weight steadily increases.

TREATMENT.—There is no specific, and treatment must be undertaken on the lines usually adopted for acute febrile diseases. Because of the liability to cardiac disorders, all but the very mildest cases should be confined to bed for at least three weeks. After that time moderate exercise may be undertaken,

In cases where there is any evidence of disordered action of the heart, **Thyroid Extract** has been found very beneficial; two grains of the extract should be given three times a day.

PROPHYLAXIS.—Trench fever being a disease of which the infection is conveyed by lice, it is obvious that prevention consists in getting rid of these insects from the bodies and clothing, not only of patients but of healthy persons. In the case of armies, efficacious prophylactic measures are often necessary on a large scale, and attention to detail is essential. In the space at my command here it is impossible to give these details, but they will be found in the reports which have already been quoted, and also in a valuable lecture by Col. W. Hunter, C.B., A.M.S.,⁹ who had a large experience in the Near East early in the war.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1918, ii, 21, 110, and 188; ²*Trench Fever*, 1918 (Oxford Univ. Press); ³*Lancet*, 1918, ii, 144; ⁴*Ibid.* 389; ⁵*Quart. Jour. Med.* 1918, July, 363; ⁶*Ibid.* 574; ⁷*Lancet*, 1918, ii, 443; ⁸*Brit. Med. Jour.* 1918, ii, 307; ⁹*Lancet*, 1918, ii, 347 and 377, and *Brit. Med. Jour.* 1918, ii, 198.

TROPICAL ULCER. (See ULCER, TROPICAL.)

TRYPANOSOMIASIS.

Sir Leonard Rogers, M.D., F.R.C.P.

W. E. Masters¹ reports on 370 cases of human trypanosomiasis treated by 6200 intravenous and intramuscular injections in the Belgian Congo, where many villages have been depopulated by the disease. In large villages 50 per cent of the people were infected, and 72 per cent of the young—apparently healthy—adults had enlarged glands. Of the total mortality, 74·3 per cent was from this disease. After fully describing the symptoms, he deals with the treatment. He considers the disease to be now less virulent in Uganda, and spontaneous recoveries are increasing, but the great majority of untreated cases die. Soamin has been disappointing and has fallen largely out of use; salvarsan preparations are costly and almost useless; atoxyl has been reported on favourably in Principe, but the writer's experience with it has not been favourable. On the other hand, he found that **Tartar Emetic** intravenously often cleared up the symptoms when all other remedies had failed. He uses a 2 per cent solution, and gives from 4 to 12 c.c., slowly increasing until toxic symptoms occur, and then reducing by 1 c.c., and injecting every other day, one week's rest being allowed after five weeks' treatment. Of 216 cases thus treated, 3·9 per cent recovered and 29·9 per cent improved, although they were nearly all in the last stage of the disease. In early cases a combination of tartar emetic, soamin, and atoxyl is being tried and promises well. He suggests that if a less toxic form of antimony, such as a stable colloidal preparation, were available, better results might be obtained. [I have for some time been using a very slightly toxic colloidal antimony preparation in kala-azar with most favourable results, and hope to record them shortly. It would certainly be worth trying in sleeping sickness.—L. R.]

C. Christy² discusses 'fly belts,' and records the great seasonal variations of the prevalence of tsetse flies in fly areas of Africa. In 160 wild animals shot by him he only found three infected with possibly human types of trypanosomes, and doubts if exterminating game will stop the infection of man. A. C. Stevenson³ reports finding trypanosomes in the brain substance of infected monkeys.

REFERENCES.—¹*Jour. Trop. Med. and Hyg.* 1918, Jan. 15 and Feb. 1, 13, and 25; ²*Ann. Trop. Med. and Parasit.* 1918, Jan., 279; ³*Jour. Trop. Med. and Hyg.* 1918, Jan. 15, 17.

TUBERCULIDE. (See ACNITIS; ERYTHEMA NODOSUM.)

TUBERCULOSIS IN CHILDREN.*Frederick Langmead, M.D., F.R.C.P.*

N. R. Blumenau¹ recognizes a pre-tuberculous stage, manifesting itself by symptoms, before those of definite tuberculosis are detected. For this stage he recommends **Tuberculin** treatment. His technique is to apply a drop of pure tuberculin to the forearm and then shave a scrap of skin through it. The superficial layer of the epidermis and the tuberculin form a thin salve, resembling lanolin, and this mixture on the back of a razor is then rubbed into the skin until dry. A piece of sticking-plaster is then applied over the spot. When removed, twenty-four or forty-eight hours later, the skin underneath may display a strong, moderate, or weak reaction, and the inoculation is repeated after an interval corresponding to the strength of the reaction. The dose of the tuberculin is progressively increased to a total of 4 drops. At first the intervals are three or four days, but once the maximum is reached, the treatment is continued weekly. The results in well-defined tuberculosis were unsatisfactory, but in incipient or occult tuberculosis were prompt and evident. He gives a brief summary of 18 cases of various types. Some of the infants were only nine or ten months old, but most were between two and thirteen years.

The parents of children often call attention to their lassitude, apathy, and drowsiness (or on the contrary to their excessive nervousness and irritability), with loss of appetite, restless sleep, frequent and persistent headache, palpitations, cough, pains in the side or chest and in the bones of the arms or legs. Such children are usually frail and badly nourished, but need not present anæmia. Under these circumstances inquiry should be made as to the health of parents and other relatives, with regard to pleurisy, chronic lung disease, meningitis, and whether anyone in the same building has a persistent cough. None of the symptoms are sufficient evidence of tuberculosis, but the tuberculin test will reveal, in many instances, that they result from chronic intoxication by that infection.

REFERENCE.—¹*Russkij Vratsch*. No. 13, p. 289 (abstr. *Jour. Amer. Med. Assoc.* 1917, ii, 1121).

TUBERCULOSIS, INTESTINAL. (See INTESTINES, SURGERY OF.)**TUBERCULOSIS, LARYNGEAL.***Arthur Latham, M.D., F.R.C.P.*

Method of Procuring Sputum in Doubtful Cases of Tuberculous Laryngitis.—Dundas Grant¹ states that he has frequently been able to procure immediately a satisfactory specimen of sputum by syringing a small quantity of a weak solution of sodium bicarbonate into the larynx and trachea with an intralaryngeal syringe. The patient coughs vigorously and ejects the liquid with a pellet of sputum into a basin. Another method is to pour a few drops of strong aromatic oil of mustard into an empty 8-oz bottle. The bottle is corked and held over a lamp for a minute or two. The patient then sniffs the vapour from the uncorked bottle. After one or more good sniffs he generally begins to cough, and may be induced to expectorate. If no cough takes place, the probability is that he is not suffering from tuberculous laryngitis.

REFERENCE.—¹*Brit. Med. Jour.* 1918, i, 100.

TUBERCULOSIS, PULMONARY.*Arthur Latham, M.D., F.R.C.P.*

An Investigation into the Epidemiology of Phthisis in Great Britain and Ireland.—Brownlee,¹ in a report upon the above to the Medical Research Committee, found that the curves of death-rates from phthisis were dissimilar in different localities, and that these differences are due to three distinct statistical types. Of these, one shows a maximum mortality in early life, one reaches a maxi-

imum between the ages of 45 and 55, and one between the ages of 55 and 65. He came to the conclusion on statistical evidence that the young adult type of phthisis is not affected to any extent by environment. It seems to be as common in better-class localities as in poorer ones. The type with a maximum mortality between the ages 45 and 55 is apparently related to the general healthiness or unhealthiness of the locality. The older type (55 and 65) does not seem to be affected by environment. From these conclusions Brownlee suggests that the disease known as phthisis pulmonalis is not a single disease, as is commonly understood, but rather a group of diseases coming into line with typhoid fever, bacillary dysentery, epidemic cerebrospinal meningitis, and pneumonia, which are now known to consist of *groups* of diseases of which the causal organisms possess similar properties and produce fevers which run almost the same course. If it is true that in phthisis we have to deal with not a single type of the tubercle bacillus, but several types, it would seem, from analogy, that in order to obtain success by vaccine or serum treatment it will be necessary to use a vaccine or serum made from the proper type of bacillus. This conclusion may suggest a reason for the conflicting opinions held with regard to the usefulness of **Tuberculin**.

The Action of Sugar in Pulmonary Tuberculosis.—Professor D. W. Manacoz states that in bronchitis a gradual diminution of secretion quickly followed subcutaneous injections of **Sugar**. If the injections are suspended before the process is complete, the expectoration sets in afresh and becomes as copious as before. The treatment is much more efficacious in non-infectious pulmonary diseases than in others. The injections are not painful, but in emaciated people it is desirable to add a little cocaine to the solution. The treatment is simple; it comprises one injection a week of 10 c.c. containing 5 grms. of cane sugar, or two of 5 c.c. containing 2.5 grms. each. The fluid must be sterilized. The author does not go further than to claim that injections of sugar reduce bronchial secretion even in the gravest cases of tuberculosis, but he states that cough and night sweats diminish and hæmoptysis ceases. In some instances an injection has been followed by fever and shivering lasting several hours. This may be due to the fact that in some cases sugar, by raising the blood-pressure, may determine the absorption of pyrogenous substances from the lung. Such an occurrence is rare, and only observed after the first few injections.

The Treatment of Pulmonary Hæmorrhage.—Dwight Clifford Martin,³ in discussing the question of drug therapy in this condition, considers that calcium salts and gelatin are of little material value. **Horse Serum**, he thinks, possesses real merit. It should be given subcutaneously in 15- to 30-c.c. doses, and repeated if needed. Its use should not be prolonged over a period of ten days, because of the danger of anaphylaxis. Contra-indications to its use are a history of diphtheria treated with antitoxin, administration of the serum itself for previous hæmorrhages, and cases of so-called 'horse asthma.' If symptoms of anaphylaxis develop soon after its administration, its use may be still further safeguarded by injecting a few drops at first, to be followed by the full dose, provided no danger signs develop. It is essential that the serum be fresh. If it is not available, diphtheria antitoxin may be used. The type of hæmorrhage mostly benefited by the use of serum is the so-called 'weeping' hæmorrhage. In these cases, where the loss of blood is at no time excessive, but is protracted over a period of several days, its helpful effect has been more noticeable.

Large doses of **Salt** increase the coagulability of the blood for a few minutes. **Sodium Bromide** does the same. A solution of sodium chloride has recently been extensively employed intravenously. Five c.c. of a 10 per cent solution

in normal saline is given once or twice a day, care being taken that none of the solution is injected into surrounding tissues. It is essential that the solution be prepared from freshly distilled water and properly heated. Those who have used this treatment most extensively report favourably concerning it.

Emetine in fair doses is said to be effective, chiefly in cases in which the amount of blood lost is comparatively small and in which high tension is present. **Adrenalin** and **Pituitrin**, of which high hopes were at one time entertained, have proved disappointing. **Atropine**, in doses of 0.02 gr., is especially valuable in the severer forms of hæmorrhage. Of special measures other than medicinal the most effective is **Artificial Pneumothorax**.

The Control of Toxæmia due to Pulmonary Excavation and Pus Retention.—Robertson¹ calls attention to the fact that the **Postural Method** of treatment, so often of service in bronchiectasis, stimulates more adequate drainage of cavities in pulmonary tuberculosis, and so adds much to the comfort of the patients. The plan outlined is about as follows: In the early morning, after the patient has finished his first morning cough or respiratory toilet, and before he has had his breakfast, he is required to lie upon the right side for twenty minutes. An hour and a half after breakfast he lies upon his left side for the same length of time. Toward the middle of the day, before having his mid-day meal, he lies on his stomach for twenty minutes. In the afternoon he is either placed in a sitting position or allowed to be on his feet for the same length of time; and at some time before retiring for the night he is put in an inverted position, by having him lie upon the stomach, crosswise of the bed, resting his head, supported by his hands, upon the floor. This routine is repeated daily, and presupposes that the patient sleeps upon his back, thus giving him a complete postural treatment that will favour the emptying of all pus cavities in his lungs having a satisfactory outlet. This routine is modified to meet individual requirements made necessary by the physical condition of the patient, and it is necessary to use judgement here as in all other therapeutic measures.

The Differential Blood-count, the Arneth Formula, and Doehle's Inclusion Bodies in Pulmonary Tuberculosis.—In this study Rowland W. Buchman² selected 50 cases of pulmonary tuberculosis in various stages of the disease and at various ages. He formed the following conclusions: (1) In pulmonary tuberculosis decided alteration in the differential blood picture is found; (2) The more advanced the disease the higher is the percentage of polymorphonuclear neutrophiles, and the lower the percentage of lymphocytes; (3) In cases tending to recovery the percentage of lymphocytes increases; (4) Arneth's formula shows that in pulmonary tuberculosis a large number of immature leucocytes occur in the blood-stream; (5) The more advanced the disease the higher is the Arneth index; (6) Arneth's index shows in a general way the progress of the disease; (7) Doehle's inclusion bodies are present in pulmonary tuberculosis, especially in advanced cases.

Latent Pulmonary Tuberculosis and Military Service.—Sakorrafos,³ Professor of Clinical Medicine at Athens, thinks that too much importance has been attached to such radioscopic signs as opacity of the apices, paresis of the diaphragmatic movements, and especially to glandular shadows in the hilum and elsewhere. The glandular lesions may be due to affections other than tuberculosis, and in the absence of clinical signs it is incorrect to regard them as evidence of latent tuberculosis. Sakorrafos has found that at least 40 to 50 per cent of persons with acute disease of the bronchi or lungs present the radioscopic signs described, but their general condition is satisfactory, and their skin reaction and sputum are negative. On the other hand, he thinks that the two following types should be exempted from military service: (1) Tall

young men of fair complexion, with a more or less slender thorax, and chest measurements below the average. Tachycardia and a low blood-pressure are present as a rule, pityriasis versicolor is not uncommon, and examination of the urine shows an increase in urea and phosphates. Radioscopy is sometimes positive. In such cases the physical strain and defective hygiene of military service cause the development of a more or less rapid tuberculosis. (2) Apparently healthy subjects, but with enlargement of the cervical, axillary, and inguinal glands. Examination of the blood shows a marked lymphocytosis, radioscopy shows glandular shadows at the hilum, but there is no clinical sign of tuberculosis.

REFERENCES.—¹Medical Research Committee, Special Report, Series No. 18; ²*La Renaissance*, 1918, June 22; ³*N. Y. Med. Jour.* 1917, ii, 738; ⁴*Southern Practitioner*, 1917, July; ⁵*N. Y. Med. Jour.* 1918, i, 492; ⁶*Bull. et Mém. Soc. Méd. d. Hôp. de Paris*, 1918, 3e Sér. xlii, 661.

TUBERCULOSIS, RENAL. (See also KIDNEY.)

John D. Comrie, M.D., F.R.C.P.

The curability of many cases of renal tuberculosis is urged by Hallé.¹ He considers that in cases where surgical intervention becomes advisable on account of the rapid increase of the disease or the deterioration of the patient, total nephrectomy is the only satisfactory method of operation. In cases, however, where there is no obvious pyelitis, but a closed tuberculous lesion is suspected, or in cases where the progress is very slow, it is advisable to wait and carry out purely medical treatment.

Dillingham² gives a report of 50 cases of tuberculosis affecting the kidney and bladder which were cured without operation. He used **Tuberculin** in small doses twice weekly, continuing in some cases as long as eleven years, with an average duration of treatment lasting three and a half years.

REFERENCES.—¹*Presse Méd.* 1917, Nov., 633; ²*Surg. Gyn. and Obst.* 1917, Oct., 378 (abstr. from *Calif. State Jour. Med.* 1917, xv, 70).

TUBERCULOSIS, SURGICAL. (See also SPINE, SURGERY OF.)

W. I. de C. Wheeler, F.R.C.S.I.

Speaking generally, operation for surgical tuberculosis in children is not necessary. When time is no object, and food and fresh air can be provided in plenty, prolonged fixation in proper appliances will cure most cases of surgical tuberculosis in bones and joints before adult life. Tuberculosis at a later age is seldom followed by cure without operative interference. The proper appliances for every individual bone and joint are now well known, and the correct angle at which to aim in case of ankylosis is definitely settled. The rôle of **Tuberculin**, however, requires more elaboration, and many different opinions are held. In determining the dose of tuberculin, some place reliance upon the reaction, some on the tolerance, and others on the opsonic index. The desired quantity of tuberculin is that amount which will produce the greatest local, focal, and general reaction without producing constitutional symptoms.

Siebert¹ draws attention to these points. The only contra-indication for the use of tuberculin was a temperature above 100°, or disease so advanced as to render any type of treatment of questionable value.

Tuberculin must be combined with the usual dietetic and hygienic measures. Good results are to be expected in cases of cervical glands, but attention must be given to the mouth, teeth, and tonsils. The duration of treatment varies very much, the only guide being the disappearance of the symptoms. Occasionally a tuberculous joint, not improving under fixation treatment, will

rapidly improve when tuberculin is employed. Early cases give the most satisfactory results, as might be expected.

Newtown and Twine² contrast 50 cases treated with tuberculin with 50 cases without. They state that without tuberculin 16 recovered, or 32 per cent; 25 died, or 50 per cent; 9 are still wearing braces and under treatment. With tuberculin 33 recovered, or 66 per cent; 5 much improved; 6 died; 5 are still under treatment; 1 discontinued treatment. The average length of the treatment per patient without tuberculin was $4\frac{7}{10}$ years, and with tuberculin 1 year and 1 month. Of the 16 cured without tuberculin, the average treatment for each case was $5\frac{1}{4}$ years; and of the 33 cures with tuberculin, each case was under treatment for $11\frac{1}{2}$ months.

The case made out for the use of tuberculin is very strong. The authors point out that, even in cases where tuberculin finally loses its remedial efficiency, it is a powerful tonic when first administered. Most of the cases operated on were of the osseous or glandular type.

Spine.—The success of Albee's operation of bone grafting for spinal tuberculosis is now established. Furthermore, bone grafting in spinal caries is attended with more universally successful results than bone-grafting in other regions of the body. In the limbs the operation is often attempted for the cure of old ununited fractures, or severe osseous injuries, the result of war wounds. In such cases the bone at the site of injury is unsuitable soil for introduction of a bone graft, and on the whole results are disappointing. Probably not more than 30 per cent of all cases of bone-graft for war injuries prove successful. On the other hand, in spinal caries the disease is largely confined to the bodies of the vertebrae in front, and the graft from the tibia is introduced into the healthy bone behind. The conditions for success are therefore ideal. In children, it is true, spinal caries, like osseous tuberculosis elsewhere, will recover with proper hygiene, good food, and absolute fixation in the recumbent position for at least a year. In many towns, however, it is impossible to provide such treatment for the children admitted to hospital. The Albee operation under these adverse circumstances offers the best chance of success. In adults the operation is seldom contra-indicated, and should be the treatment of choice. If a spinal graft is employed in the case of a child, it is advisable to administer alkalis and carbohydrates for some days previous to the operation, and to refrain from the use of chloroform even in diluted forms. These precautions are necessary owing to the frequency of acidosis in prolonged bony operations in the case of children. With Albee's saw the operation can be greatly shortened, and the shock reduced. In fifteen recent cases the writer (W. I. de C. W.) has employed the lateral graft. A fresh bony bed is made by the side of the spinous processes underneath the erector spinæ muscle, the bone is chipped away with gouge and chisel, and loose fragments are left *in situ*. With the patient still in the prone position the leg is acutely flexed at the knee, and the graft rapidly taken with the Albee saw from the subcutaneous surface of the tibia, well away from the crest. The graft is lifted from the tibia into the freshened bed, the erector spinæ muscle replaced, and the operation completed by suturing the aponeurosis. If the entire leg and back are prepared in the first instance, and the motor saw ready to hand, the operation can be completed in about half an hour. A double Thomas or Jones frame is placed in position with the patient still prone on the operating-table. The patient is then rolled over without movement of the spine. Attention has already been called (MEDICAL ANNUAL, 1918) to the danger of rough handling under an anæsthetic of a child with tuberculosis of the spine. The support of the erector spinæ muscles is gone, and the spine may buckle or dislocate backwards if any unguarded movements of the patient are made.

M. S. Henderson³ reports 81 cases of Pott's disease operated upon from July, 1912, to July, 1916; 274 cases of tuberculosis of the spine having been observed in that time at the Mayo clinic. The Albee operation was performed in 74 cases, and the Hibbs operation in 7. A careful follow-up record showed 7 deaths after operation up to the time of publication. Of these, 2 were cured of the tuberculous spinal disease, but died of military pulmonary tuberculosis. Of the 81 cases, 8 were not satisfactory to include in reports; therefore 73 cases constituted the report. Thirty-one (42.2 per cent) were cured, and 33 (45.2 per cent) relieved. There were no operative deaths. Operation was not advised in young children, but conservative measures were advocated.

Waterhouse⁴ deals with the non-operative treatment of tuberculous disease of the larger joints and of the spine. He points out that tuberculous lesions heal by fibrosis, and pyogenic lesions by phagocytosis. He believes in tuberculin in the treatment of surgical tuberculosis. The dose varies greatly. He commences with Koch's new tuberculin (T.R.), 1/20,000 mgrm., given by subcutaneous injections. Injections are given weekly for twelve weeks, the last dose being 1/1000 mgrm.—that is to say, twenty times the original dose. The actual dosage in milligrammes is as follows: first, 1/20,000; second, 1/15,000; third, 1/12,000; fourth, 1/8000; fifth, 1/6000; sixth, 1/4000; seventh, 1/3200; eighth, 1/2400; ninth, 1/1800; tenth, 1/1500; eleventh, 1/1200; twelfth, 1/1000. It will be noticed that the increase of each dose is 40 or 50 per cent. If decided reaction occurs after any dose, there should be no increase next time. By reaction is meant the rise of temperature of a couple of degrees, with pain and malaise, and redness about any superficial lesion.

The power of resistance to tuberculosis varies greatly in the different tissues. In the peritoneum it is at its maximum, in the meninges at its minimum. In childhood the power of resistance to the bacillus is great, and decreases as age advances. Senile tuberculosis is by no means rare, especially in the knee-joint. Bier's hyperæmic treatment helps if properly applied, especially in the arm and leg below the shoulder and hip-joints. The bandage should retard the venous return so that the limb below pits on pressure. There should be no pain, and it should be employed for from eighteen to twenty-two hours per diem. After a while the patient is the best judge of the tightness of the bandage. A drainage tube should never be inserted into a tuberculous abscess.

Tuberculosis of the spine is easily diagnosed in children, but in adults the first symptom is often pain in the back, relieved by rest in bed. Usually there is a slight elevation of the temperature in the evening. An abscess must never be allowed to burst or be drained. If paraplegia occurs, it is never directly associated with the angular curvature of the bone, but is always due to the development of tuberculous granulation-tissue round the meninges of the cord. Laminectomy is hardly ever indicated, but if weight-extension is applied for six to twelve months, in the majority of cases the paraplegia disappears. Extension and absolute rest are the basis of the non-operative treatment for spinal tuberculosis.

Hip-joint.—The prognosis is always grave, and it requires at least eighteen months of treatment. Conservative treatment should be the rule. The limb should be extended in abduction, and to make this effective the abduction must be bilateral. It is sufficient to abduct the sound limb with a sand-bag, without extension. When all signs of active disease have disappeared, a Thomas splint, with a patten attached to the sole of the boot of the sound limb, acts admirably.

Knee-joint.—The rule of no operation in children should be followed when possible. In patients of from fourteen to twenty-four years of age, sometimes

the only sign is hydrops, and this condition usually results in complete cure. Bier's hyperæmic bandage, repeated injections of 10 per cent iodoform-glycerin emulsion, and rest, are the proper treatment. As in the case of hip-joint disease, when pain, tenderness, and muscular spasms have disappeared, the patient may be allowed to move about on crutches with a Thomas splint, and a patten attached to the boot of the sound foot.

Ankle-joint.—Fixation in plaster-of-Paris, combined with Bier's bandage above the knee, and iodoform-glycerin injections, gives a relatively good result. Amputation is rarely necessary.

Shoulder-joint.—The prognosis is better than in any of the other large joints. Ankylosis usually results, and therefore the limb should be treated in abduction, with the elbow tilted forwards. The disease frequently takes the form of caries sicca.

Elbow-joint.—Recovery is often secured, with a movable joint. As in injuries about the elbow and forearm, pronation deformity is apt to occur, and therefore it is best to put the patient under an anæsthetic and fix the arm in not quite full supination, flexed to an angle of about 95° or 100°.

Wrist-joint.—Tuberculosis of this joint occurs more frequently in adults. Operative treatment is usually called for, and in the after-treatment the rule of fixing the wrist in dorsiflexion must be rigidly followed.

REFERENCES.—¹*Amer. Jour. Med. Sci.* 1917, ii, 365; ²*Med. Rec.* 1918, ii, 407; ³*Journal-Lancet*, 1917, xxxvii, 371 (abstr. *Surg Gyn. and Obst.* 1917, Oct., 356); ⁴*Practitioner*, 1918, Jan., 8.

TUBERCULOSIS OF THE TONSIL. (See TONSIL.)

TUMOURS, ACOUSTIC. (See NERVUS ACUSTICUS.)

TYPHOID FEVER. (See also PARATYPHOID FEVER.) J. D. Rolleston, M.D.

ETIOLOGY.—The question of typhoid carriers is discussed by Messerschmidt and Eisenlohr.¹ As the result of their investigation of the stools, urine, and blood of more than 100 persons, 73 of whom were examined regularly for more than three years, they came to the following conclusions. It is very exceptional to find typhoid bacilli with any regularity in the stools and urine. The ordinary three examinations made for detecting carriers are rarely sufficient. In many instances twenty examinations or more have to be carried out before a single positive result is obtained. This fact must be taken into consideration in supposed cases of recovery of typhoid carriers. Widal's reaction, which has been recommended for the detection of typhoid carriers, is unreliable, as in 42 carriers investigated, 7, or 17.6 per cent, gave a negative reaction.

During a period of eighteen months Reibmayr² made several thousand clinical and bacteriological investigations on 132 carriers, 9 of whom were typhoid, 22 paratyphoid A, and 101 paratyphoid B carriers. He found that paratyphoid B carriers do not pass bacilli in the stools until convalescence. In paratyphoid B fever urinary carriers are very rare, but throat carriers occur. Twenty-five per cent of the carriers cease to excrete bacilli within six months of the disease. During the first fifteen months cholecystitis plays an unimportant part, although diffuse pains in the upper part of the abdomen are frequent. Cholecystitis is rather a consequence than a cause of the chronic carrier state.

SYMPTOMS.—According to Goldscheider,³ abortive forms of typhoid fever described by Griesinger in 1864 are now, owing to inoculation, more frequent than the fully-developed disease. The diagnosis is obscured by the frequent absence of bacilli from the blood and fæces, and by the knowledge that a positive agglutination reaction, and in some cases splenic enlargement, result

from inoculation. Afebrile cases with rose spots and bacilli in the stools have been observed, as well as abortive cases with leucopenia down to 3000 leucocytes, a positive diazo reaction, and occasionally typhoid bacilli in the urine and faeces. The mortality of enteric fever among inoculated patients has fallen to 1 or 1.05 per cent.

Abortive typhoid fever may occur apart from inoculation. Löwy⁴ states that it is not uncommon in Serbia, and may simulate malaria. He describes an epidemic of this kind among uninoculated children in a Serbian town where the diagnosis could be made only by the laboratory results, as the temperature was misleading. A similar abortive outbreak of typhoid fever among uninoculated school-children is recorded by Weltmann.⁵

S. Bradbury⁶ reports four cases of typhoid fever in a company of 175 men who had been inoculated only five months previously, each of them having received three doses of typhoid and three doses of paratyphoid vaccine. None of them had a severe illness, though 1 developed a phlebitis in one leg. Six weeks' hard work, with long hours and irregular meals, and exposure to an extremely heavy dose of infecting bacilli, were possible factors in the infection.

Bergolli⁷ records 3 cases of *chronic enteric fever*—1 of a year's duration due to the typhoid bacillus, and 2 lasting ten months and a year respectively, due to paratyphoid B. A study of the reported cases shows that they may be divided into four groups: (1) Those due to complications; (2) Those associated with severe anaemia; (3) The most frequent, a mild septicæmia with gastro-intestinal symptoms: these cases may show either almost continuous fever or more or less long periods of apyrexia; (4) Cases diagnosed as intestinal catarrh, febrile dyspepsia, or tuberculosis, but which are shown by blood cultures and agglutination tests to be examples of prolonged enteric.

In an article on the arterial and venous blood-pressures in the enteric group of fevers, H. F. Marris⁸ comes to the following conclusions: (1) Low systolic pressures were constantly observed in severe cases, and a very close approximation of the systolic to the diastolic pressure in the fatal cases; (2) When the arterial pressure fell, the venous pressure rose, and vice versa; (3) Anti-enteric inoculation produced a temporary fall in the arterial pressure similar to that seen during an infection by each or any member of the group; (4) The arterial and venous pressures in the typhoid group are hardly influenced by the exhibition of amyl nitrite; (5) The rise of blood-pressure after adrenalin was only about 6 to 8 mm. Hg, instead of 30 to 40 mm. shown in normal subjects, the failure of the vascular musculature to respond to the suprarenal secretion indicating the action of the bacterial products either upon the muscles themselves or upon the myoneural elements of the vessel walls.

Paralyses of the peripheral nerves in the course of or in convalescence from typhoid fever are comparatively rare. Cestan, Descomps, Euzière, and Sauvage⁹ report three cases occurring in convalescence, in which a local pre-disposition played an important part in the pathogeny. The first was a case of neuritis of the left external popliteal nerve following an attack of post-typhoid phlebitis of the left leg. The second was also a case of neuritis of the left external popliteal occurring in a leg from which varicose veins had been removed four years previously. The third was a case of ulnar neuritis in a patient who had fractured his elbow four years previously.

S. Bayne-Jones¹⁰ reports a case of *purulent cerebrospinal meningitis* due to *B. typhosus* occurring in the fourth week of a typical attack of typhoid fever. Death took place within a few days from the onset of meningitis. The paper contains a summary of 17 other cases of purulent typhoid meningitis, in 3 of which the meningitis was primary, and of 17 cases of serous meningitis occurring in typhoid fever.

The first case on record of *oto-typhoid*, or exclusive localization of typhoid infection in the ear, is reported by Fleischmann.¹¹ A boy, age 11, fell ill with catarrhal sore throat and fever. Right otitis media developed at the same time, spontaneous perforation of the drum ensued, and a mastoid abscess occurred. Antrotomy was performed, and rapid recovery took place. Examination of the pus from the mastoid abscess showed typhoid bacilli and a much smaller group of *Streptococcus brevis*. No other signs of typhoid fever were present. Widal's reaction, however, was positive in 1 in 160.

Lesieur's sign, or an impaired note on light percussion at the base of the right lung behind, was found by Campani and Bergolli¹² in 44 out of 105 cases of typhoid fever, and in all the positive cases there was evidence of catarrh at the bases of the lungs, especially the right. The writers therefore regard the sign as due, not, as supposed by Lesieur, to hepatic enlargement following infection of the liver and bile-ducts, but to hypostatic pulmonary engorgement, its presence on the right side being principally caused by the base of that lung resting on the solid and often congested liver.

The frequency of *atony of the cæcum* as a sequel to enteric fever is estimated by Loeper¹³ as about 65 per cent. It is apparently more frequent in paratyphoid than in typhoid. The atony is due to lesions of both the mucous and the muscular coats, as in certain forms of gastric dilatation secondary to infective gastritis. The principal symptoms are diarrhoea followed by constipation and mucorrhœa. Attacks of pain and fever may also occur, usually following more or less pronounced periods of constipation. On palpation a soft or slightly resistant cæcum is found which gurgles or even splashes. X rays showed a distended and generally very immobile cæcum nearly always lying oblique, and curved on itself.

DIAGNOSIS.—Pennetta¹⁴ employs an intradermo-reaction for the diagnosis of typhoid and paratyphoid. He gives three intradermal injections simultaneously, consisting of typhoid, paratyphoid A, and paratyphoid B vaccines, made of organisms killed by heating them to 60° C. The appearance of a red papule at the end of forty-eight hours, which is the sign of a positive reaction, was observed in 10 out of 15 cases of typhoid, in 3 out of 5 cases of paratyphoid A, and in 9 out of 10 cases of paratyphoid B. A positive result was thus obtained in 73.3 per cent of the enteric cases. The reaction was also positive in 8 out of 11 recently inoculated persons, but negative in other infectious diseases and in healthy persons who had not recently been inoculated. The author concludes that the reaction has the same value in the diagnosis of enteric as von Pirquet's reaction in the diagnosis of tuberculosis.

The atropine test for the diagnosis of typhoid infections described by Marris (see MEDICAL ANNUAL, 1918, p. 574), was investigated by A. Friedlander and C. P. McCord¹⁵ in 170 non-typhoid cases, 36 per cent of which gave results characteristic of typhoid. The writers therefore conclude that the test is without especial value in the detection of typhoid infection.

Although enlargement of the spleen after antityphoid inoculation has been recorded by various writers, their observations are open to the criticism that the condition of the spleen before inoculation was unknown, or that some intercurrent infection may have been responsible for the enlargement. Von Hoesslin¹⁶ has examined a large number of men in the field and at home, at the time of inoculation and for a long time afterwards, without finding a single case of splenic enlargement, even when the reaction was remarkably severe. Kathe,¹⁷ who confirms von Hoesslin's observations, regards enlargement of the spleen as the most valuable means of diagnosis in enteric fever, especially as it appears early in those who have previously been inoculated.

H. M. Perry,¹⁸ in an article on the agglutination method of diagnosis in triple inoculated individuals, states that if the technique is carefully carried out, a change in titre of 100 or 200 per cent, manifesting itself in a regular curve and reaching its maximum between the sixteenth and twenty-fourth days (in exceptional cases as late as the thirtieth day), justifies a diagnosis of acute enteric infection. In many cases the exact organism can be determined, because the rise in titre for one organism is so pronounced. When, however, the rise or fall for all three organisms occurs simultaneously and equally, the member causing the infection cannot be determined.

PROPHYLACTIC INOCULATION.—Striking proof of the value of antityphoid inoculation in war is furnished by Bruns.¹⁹ In the Franco-Prussian war of 1870–1 there were 75,000 cases of typhoid fever among a million German soldiers, whereas in 1914–15 among six to seven million German soldiers only 20,000 cases occurred; 480,000 cases of typhoid yearly have thus been prevented. Up to 1876 the mortality from typhoid fever in the German Army was 2.5 per 10,000, whereas in 1915 it was only 0.27 per 10,000.

P. W. Bassett-Smith²⁰ gives an account of the anti-typhoid inoculations and cases of infection in the Navy from October 1, 1916, to September 30, 1917. Comparatively few reactions caused any discomfort or necessitated hospital treatment, even when the triple vaccine was combined with the cholera vaccine, as was necessary in cases going to Russia. Of 21,695 inoculated, 1578 were given one and 20,117 two injections. The total number of enteric cases occurring during this period was 144, consisting of 93 typhoid cases with 3 deaths, 21 paratyphoid A cases with 1 death, and 30 paratyphoid B cases. Of the 93 typhoid cases, 66 had not been inoculated, 13 had been inoculated twice, 6 once, and in 8 inoculation was doubtful. The 3 fatal cases had not been inoculated. The protection appeared to be greatly reduced after a period of twelve months, and inoculation should certainly be repeated at the end of eighteen months. Of the 21 paratyphoid A cases, 3 had been inoculated once, 9 twice, 6 (including the fatal case) had not been inoculated, and in 3 inoculation was doubtful. Of the 30 paratyphoid B cases, 1 had been inoculated once, 12 twice, 13 had not been inoculated, and in 4 inoculation was doubtful. The protective power of the inoculations was thus greater against paratyphoid B than against paratyphoid A, but not so definite as against typhoid.

In their inoculation of Annamite troops in 1917 with vaccines sterilized by iodine, Ranque and Senez²¹ found that violent reactions occurred only in 1.5 per 1000 and slight reactions in only 17 per 1000, while out of 20,000 persons thus immunized, no instance of typhoid occurred at the end of one year, after two years only 1 mild case, and after three years 2 mild cases. The dosage was 1, 1½, and 3 c.c. of a mixed T. A, B vaccine containing 500 million per c.c. of typhoid bacilli and 250 million per c.c. each of paratyphoid A and B bacilli, the inoculations being given at intervals of seven days.

Antityphoid vaccination has hitherto been employed almost exclusively in military communities. The result is that while the typhoid wards in military hospitals are almost empty, the civilian population still continues to be infected. H. A. Alliot²² therefore recommends the compulsory inoculation of all healthy civilians of both sexes under 40 living in districts where enteric fever is endemic, and also in cases of epidemics. The number of injections should be at least two, the first consisting of 1 c.c. and the second of 2 c.c. of T. A. B vaccine; but it is advisable to make a preliminary inoculation consisting of ½ or ¾ c.c., so as to test the sensitiveness of the individual as well as to increase the immunity. Re-vaccination should be carried out every year,

or at least every two years, by a single injection of 1, 1½, or 2 c.c., according to the strength of the individual.

As the result of their investigations, G. Dreyer, A. G. Gibson, and E. W. Ainley Walker²³ are convinced that the dosage of Castellani's triple vaccine is very much too small, and that a vaccine containing not less than 1000 million typhoid bacilli and 750 million each of paratyphoid A and B bacilli per c.c. in doses of 0·5 c.c. and 1 c.c. as first and second dose respectively, should be used to ensure adequate protection against typhoid and paratyphoid infection. The writers believe that a more lasting immunity is obtained by giving the second dose of vaccine at a time when the effect of the first has approximately reached its maximum. The interval between the first and second dose of vaccine should therefore be lengthened from ten days to eighteen or twenty days.

TREATMENT.—Pennetta and Melosci²⁴ discuss the **Vaccine** treatment of typhoid fever. Subcutaneous injections of vaccine in doses ranging from 20 to 1000 million were given to 20 patients, with the following results: 10 per cent were cured, i.e., showed complete or almost complete apyrexia within three days of the third injection; 20 per cent were improved, and in 70 per cent no effect was produced. With intravenous injections of 5 to 200 million bacilli the results were much better. Of 100 cases, 43 were cured, 21 were improved, and 36 unaffected. The percentage of cures increased with the dose, so that with doses of 200 million the rate of cures rose to 63 per cent. This dose, which does not cause any serious symptoms, should not be exceeded. The number of injections varies with the doses, so that in doses below 100 million three and occasionally four injections are required, and with doses above 100 million one or two injections only are sufficient. As a rule a subsequent injection should not be given until the reaction from the preceding injection has subsided, i.e., usually twenty-four hours. The morning is the best time for injection, as by the following morning the reaction will have completely passed off. The contra-indications to vaccine treatment are myocardial degeneration, intestinal hæmorrhage, perforative peritonitis, and well-marked meningeal symptoms. Bronchopneumonia of limited extent and renal complications are not contra-indications.

A. Pearson²⁵ treated 80 cases of typhoid fever with Burroughs and Wellcome's typhoid vaccine, and came to the following conclusions: (1) Injections of typhoid vaccine were followed by more frequent improvement than could be explained by coincidence; (2) There was no evidence of the unfavourable operation of a negative phase; (3) There was no sign of any disposition of the injections to produce special complications or danger; (4) The vaccines diminished a tendency to relapse.

Ranque and Senéz²¹ used their vaccine for therapeutical purposes in doses of 250 to 1000 million with good results, the duration of the disease being shortened and complications and relapses being suppressed.

Martin²⁶ reports on the treatment of typhoid fever by **Rodet's Serum**, which is derived from a horse immunized by a series of very active cultures of previously filtered typhoid bacilli. The horse is injected every eight to ten days for three or four months; a very highly antitoxic serum is thus obtained. It should be used before the eleventh day of disease, and should therefore be injected as soon as possible without waiting for bacteriological confirmation of the clinical diagnosis. The injections are given subcutaneously in doses of 15 c.c. for the first injection, 10 c.c. for the second, and 5 c.c. for the third. The second and third injections should not be given unless the general condition gets worse or the temperature shows a tendency to rise. Two injections are often sufficient. The effects of the treatment are rapid and pronounced

improvement of the general condition, diminution of prostration and fever, strengthening of the pulse, and considerable shortening of the duration of the disease. Although the serum is specific for typhoid and is not polyvalent, in many cases it is beneficial in paratyphoid.

Methylene Blue in 3-gr. doses in the form of a wafer or a gelatin capsule was given by Galambos²⁷ every four hours for seven and in some cases for ten days. In two-thirds of the cases the effect of treatment was well marked, but in one-third it did not exert any influence. Methylene blue has the advantage over some methods of treatment, such as vaccines, that it can be given in the worst cases without any anxiety about bad effects. Relapses occurred in 1 per cent of the cases treated with methylene blue, and in 6 per cent of the cases on pyramidon and other lines of treatment, complications were noted in 5 and 28 per cent, and death in 4 and 8 per cent respectively, of the two series. The antipyretic effect of methylene blue is slight compared with that of pyramidon, and experimentally it is shown to inhibit the growth of typhoid and paratyphoid A bacilli, but not to be bactericidal.

For post-enteric atony of the cæcum Loeper¹³ recommends the administration of 3 grms. of **Bismuth** half an hour before each meal and 0.1 to 0.15 gm. **Collargo** daily. The diet should be principally milk and farinaceous, while lactic acid ferments, by diminishing the putrid fermentation, may retard or ward off the acute symptoms. When medical treatment is insufficient, ileo-, colo-, or sigmoidostomy is indicated.

Glaserfeld²⁸ advocates **Veronal** for night sweats in enteric in two doses of 5 gr. each in hot tea or as a tablet, some patients being free from sweats for days after taking veronal. In most cases, however, the sweating recurred when the drug was omitted, and it was then necessary to resume it, but it was reduced to 7, 5, and 2½ gr., and it was never necessary to give the drug for more than eight days in succession. No bad effects were observed.

Glucose injections in (p. 4.)

REFERENCES.—¹*Med. Supplement. Rev. Foreign Press*, 1918, 290; ²*Ibid.* 290; ³*Ibid.* 131; ⁴*Ibid.* 175; ⁵*Ibid.* 27; ⁶*Jour. Amer. Med. Assoc.* 1918, ii, 532; ⁷*Med. Supplement. Rev. Foreign Press*, 1918, 175; ⁸*Quart. Jour. Med.* 1918, 339; ⁹*Bull. Soc. méd. Hôp. de Paris*, 1918, xlii, 506; ¹⁰*Amer. Jour. Med. Sci.* 1917, ii, 55; ¹¹*Münch. med. Woch.* 1918, 186; ¹²*Med. Supplement. Rev. Foreign Press*, 1918, 175; ¹³*Lancet*, 1918, ii, 395; ¹⁴*Med. Supplement. Rev. Foreign Press*, 1918, 339; ¹⁵*Jour. Amer. Med. Assoc.* 1918, i, 1435; ¹⁶*Med. Supplement. Rev. Foreign Press*, 1918, 9; ¹⁷*Ibid.* 289; ¹⁸*Lancet*, 1918, i, 593; ¹⁹*Med. Supplement. Rev. Foreign Press*, 1918, 289; ²⁰*Jour. R. N. Med. Service*, 1918, 141; ²¹*Lancet*, 1918, i, 508; ²²*Paris Méd.* 1918, ii, 100; ²³*Lancet*, 1918, i, 498; ²⁴*Med. Supplement. Rev. Foreign Press*, 1918, 290; ²⁵*South Afr. Med. Rec.* 1918, 164; ²⁶*Med. Supplement. Rev. Foreign Press*, 1918, 384; ²⁷*Ibid.* 210; ²⁸*Ibid.*

TYPHUS FEVER.

J. D. Rolleston, M.D.

Morbid Anatomy.—Jaffé's¹ description of the morbid anatomy of typhus is based on 40 necropsies on patients who died between the tenth and sixteenth days of disease, generally from complications, and in only one-third of the cases from the disease itself. Bronchopneumonia, which was the most frequent complication, occurred in one-third of the cases, others being suppurative cellulitis, pulmonary abscess, and empyema. Large subcutaneous hæmorrhages were often found near the sites of hypodermic injections, and small ones on the pericardium, pleuræ, and often in the gastric, intestinal, and vesical mucous membranes. The eruption, though it may be somewhat faded, can usually be recognized after death by its petechial character, and thus may be useful for diagnostic purposes. The muscles are extraordinarily dry, and a greasy condition of the peritoneum is almost constant. The muscles also show Zenker's degeneration. The spleen shows characteristic changes; in the early stage it is always, and sometimes very much, enlarged, extremely

soft, and even in uncomplicated cases greyish-red in colour. At a later stage it diminishes somewhat in size and becomes firmer. The kidneys show punctiform hæmorrhages which stand out in contrast to the rest of the pale-pink surface. The capsules strip off readily. The adrenals are usually very deficient in lipid. The liver does not present any characteristic changes, but the bile is extremely thick, treacly, and black-green in colour. To the naked eye the brain is normal, but the cerebrospinal fluid is somewhat increased in amount. Microscopical examination shows the presence of the specific nodules first described by Fraenkel. The fully developed nodules are first seen on the tenth day. All the organs are simultaneously affected, but the nodules grow most rapidly in the skin, where they become mature earlier than elsewhere. In the late stage the nodules are fewer, smaller, looser in structure, and less clearly defined than at the height of the disease. They persist for a long time, but gradually disappear entirely without any resulting cicatrization. The nodules are due to the typhus virus or its toxin in the blood, and to one or both of the following effects: (1) Direct damage to the vessel wall, which may be followed by swelling, separation, and necrosis of the endothelium; (2) Hyperplasia due to irritation and the formation of a nodule. Lymphocytes collect inside the vessel, migrate, and form an area of infiltration in the neighbourhood, with proliferation of the adventitial cells which form the main part of the nodule.

SYMPTOMS.—Jürgens² points out that typhus, as compared with enteric, is remarkable for its uniformity, one case being just the same as another, and without the variable features seen in enteric. This is partly because relapses and recrudescences do not occur, and partly because the course of typhus is comparatively so rapid that complications are not so frequent or so severe as in prolonged typhoid fever with its special dangers due to the intestinal lesions.

Bardachzi and Barabás,³ from 'observations on an epidemic of typhus in East Galicia, conclude that undoubted cases of typhus may occur without any rash, and may be very slight in other instances. Such cases are specially likely to occur where the disease is epidemic, and help to spread the infection.

In an epidemic in a prisoners' camp in Eastern Siberia, reported by Petschacher,⁴ from November, 1915 to May, 1916, among 9000 men 2200 or 24 per cent were attacked, and 34 per cent died. The rapid spread and high mortality were attributed to defective hygiene and the absence of medical and nursing care. Cases with a rapid onset and ending by crisis did well, but a fall of temperature by lysis was generally followed by active tuberculosis and other sequels. Complications and sequels were frequent; e.g., stomatitis, parotitis, and otitis from oral sepsis, bronchopneumonia, bed-sores, and gangrene of the feet. Tuberculosis, erysipelas, small-pox, scarlet fever, diphtheria, enteric, and relapsing fever were prone to attack convalescents. Nervous complications, such as neuralgia, neuritis—specially ulnar and peroneal,—psychoses with auditory and visual hallucinations, and amnesia were common.

J. A. Mitchell⁵ states that outbreaks of fever of an anomalous type have occurred in the Cape Province since 1886 or earlier. Resemblance of the disease to typhus had long been recognized, but owing to the absence or rarity of a rash a definite diagnosis could not be made. Recently considerable outbreaks have occurred in various districts in the province. The rash now occurs in a considerable proportion of the native and in most of the European cases. A number of cases both in Europeans and natives have followed the typical course of typhus throughout, so that there is no longer any doubt that the disease is a form of typhus.

According to Chiari,⁶ conjunctival changes are almost constant in typhus. The conjunctivæ are at first vividly red, and later, when the cutaneous eruption has appeared, they show bluish-red spots. The conjunctival hæmorrhages occur before the cutaneous ones, are met with in cases without skin hæmorrhages, and may persist into convalescence. Microscopically the conjunctival vessels show the necrosis of the vessels and perivascular infiltration which Fraenkel described as characteristic of the cutaneous vessels in typhus. Dantrelle⁷ states that various ocular complications may occur either in the febrile stage or in convalescence. During the febrile stage, lesions of the iris, with secondary cataract, optic neuritis, and paralysis of the oculo-motor nerve or external rectus may occur. The complications met with in convalescence are more frequent, and are generally due to streptococcal infection, consisting in palpebral abscess, inflammation of the orbit, corneal ulcer, and optic atrophy.

The chief complication seen by Rudelle⁸ during the Rumanian epidemic of typhus was arteritis of the lower limbs and genitals, giving rise to gangrene. The upper limbs were very rarely affected. This complication did not occur until after the twelfth day, and usually did not develop until convalescence or even later. The gangrene of typhus is a dry gangrene, and only very exceptionally moist in character.

DIAGNOSIS.—The Weil-Felix reaction, which has been widely accepted by German workers as a diagnostic method in typhus, consists in the agglutination of cultures of a proteus-like organism named X19, by the serum of typhus patients. According to Friedberger⁹ the reaction is absolutely specific for typhus, and an agglutination is not given by any normal serum or the serum in any other febrile disease in a greater dilution than 1-100. In typhus a positive result is given in 90 per cent. The agglutination occurs in two hours at 37° C., and reaches 1-1000 to 1-2000, or even higher. The reaction begins very early in the disease, being already 1-25 to 1-50 in the first week. Thereafter the agglutination curve rises rapidly to a pinnacle, and gradually falls in convalescence. The general consensus of opinion is that the organism X19 is not the cause of typhus fever, but is a specific secondary invader of the body which always accompanies the unknown virus of typhus. The reaction is of special value in mild cases such as are met with in children, in whom there may be no eruption, and other characteristic symptoms, such as conjunctivitis, bronchitis, and nervous manifestations, are absent. C. M. Craig and N. Hamilton Fairley,¹⁰ who employed it in Egypt and Palestine, regard the reaction as particularly useful in the case of natives, in whom it may be difficult to distinguish clinically between severe relapsing fever and typhus.

TREATMENT.—**Transfusion with Blood** obtained from convalescent patients is recommended by Kabelek.¹¹ Whole blood is employed, as it is more likely to be sterile than the serum. The syringe is washed through with a 4 per cent solution of sodium citrate in normal saline, and an amount equal to one-tenth of the blood to be withdrawn is retained, e.g., 2 c.c. when 20 c.c. of blood are to be taken. The blood is then withdrawn from the vein, mixed with the citrate in the solution in the syringe, and injected into the febrile patient. The earlier in the disease the transfusion was given, the better the results. If given before the rash appeared, a prompt and permanent fall of temperature resulted; when administered late, recovery was not so rapid, but the course of the disease was shortened and the symptoms were relieved. No bad results were observed.

Danielopolu¹² recommends intravenous injections in some cases. As hypochlorite of sodium as used in the Carrel-Dakin treatment is hæmolytic, a solution of 6.5 grms. of sodium chloride and 0.4 gm. of chlorine was used instead.

The quantity given was never more than 500 c.c., and no bad results were seen, except for a rigor. The injections were given daily for eight to ten days. The mortality among 60 severe cases was only 10 per cent, though in this type of case it is usually 92 per cent.

REFERENCES.—¹*Med. Supplement Rev. Foreign Press*, 1918, 176, 249, 290; ²*Ibid.* 90; ³*Ibid.* 28; ⁴*Ibid.* 64; ⁵*S. Afric. Med. Rec.* 1917, 259; ⁶*Med. Suppl. Rev. Foreign Press*, 1918, 90; ⁷*Ibid.* 384; ⁸*Ibid.* 385; ⁹*Deut. med. Woch.* 1917, Oct. 18 (abstr. *Brit. Med. Jour.* 1918, i, 65); ¹⁰*Lancet*, 1918, ii, 385; ¹¹*Med. Supplement Rev. Foreign Press*, 1918, 211; ¹²*Ibid.* 64.

ULCERATING GRANULOMA OF PUDENDA. (See GRANULOMA VENEREUM.)

ULCER, TROPICAL.

E. Graham Little, M.D., F.R.C.P.

This is a specific ulceration very frequently met with in warm climates, due to the presence of a symbiosis of the fusiform bacillus and spirochaetes (not syphilitic), with an association less commonly of streptococci and staphylococci. The formidable destruction it may cause is shown by the observation that a centimetre of healthy tissue may easily be necrosed in a single day. Bouffard,¹ after experimentation with several antiseptic applications, including iodine, permanganate of potash, and mercurials, after trial of free excision of the edge of the ulcer, which in his opinion only makes matters worse, and also after complete failure with intravenous injections of arsenobenzol and novarsenobenzol, found a most remarkable improvement with local application of a 3 per cent solution of **Novarsenobenzol** in distilled water. This was soaked in lint and applied direct, being insinuated into the crevices of the ulcer, and renewed twenty-four hours later. Two applications in the majority of cases sufficed to abolish the special infection, and therefore the phagedænic process, after which simple dressings with 1 per cent picric acid were used. In three cases, in which staphylococci and streptococci were associated with the specific fusospirillar infection, a third application of the novarsenobenzol was required.

Saporté² offers the following suggestions for treating this very intractable disease of tropical countries. The ulcer is to be bathed for two hours with hot solutions of **Potassium Permanganate** 1-4000, and then dressed with boiled-water compresses; on the second day the permanganate lavage is repeated, and all sloughing and necrosed tissue is removed, and the wound dressed with a powder known as **Vincent's Powder**, and consisting of fresh hypochlorite of calcium, 10 parts, to 90 parts of dry boric acid powder. On the third day the wound is again washed with permanganate for an hour, and powdered over freely. This procedure is continued until cure results; or if cicatrization seems delayed, lavage of the wound with physiological **Salt Solution** is recommended, followed by dusting the surface with powdered **Zinc Oxide**. Healing takes place in from eight to eleven weeks as a rule. The patient is kept in bed and should be well fed. **Quinine** and **Arsenic** may be given at the same time with advantage.

Halpin³ describes a method of treating these ulcerations which seems to have great advantages. The ulcers are thoroughly curetted, and wiped with sterile **Normal Saline Solution**. A 20-c.c. syringe is then filled with the same solution, and the contents are injected under the floor of the ulcer, which bulges and remains distended for about an hour. It is then covered with gauze soaked in normal saline, and the treatment repeated daily while ulceration lasts. A cure followed in most of the cases within three weeks, notwithstanding that the cases were selected as having lasted for more than six months, and as showing ulcerations of an area of two inches diameter or more.

Wade⁴ contributes a very fully illustrated and interesting paper on his

observation of six cases of a chronic ulcer met with in natives of the Philippines, the causation of which remains doubtful. He was able to grow in two instances a cryptococcus, which is described as an organism that reproduces by budding only, and does not form mycelia or spores, and is to be regarded as a degraded form of a higher fungus. From a series of elaborate experiments this author comes to the conclusion that in these cases there is an intracellular amorphous substance, not differentiable from cell protoplasm, which he calls cryptoplasm, and which is assumed to be the infective agent and to be able to produce the cryptococcus in certain conditions of parasitism. The paper is written entirely from the laboratory standpoint; the clinical description is very like the sporotrichial ulcerations with which we are becoming increasingly familiar, and in which the organism is sometimes difficult to discover. **Iodide of Potassium** in large doses caused improvement in the short time that the cases could be kept under observation.

Spick⁵ evolved, from a large personal experience of these ulcerations seen in Morocco, a scheme of treatment which he describes as follows: The ulcer is cleaned with hydrogen peroxide, and the edges cut flat with scissors, the whole surface powdered with **Iodoform**, and a hot cautery blade passed over the iodoform, a procedure which sets free nascent iodine which thus impregnates the wound. The surface is again powdered with iodoform and dressed with sterile gauze, the dressing changed every day, and every fourth day the cauterization is repeated. The gangrenous matter is usually thus removed in about twelve days, when **Nitrate of Silver** pencil may be used. In seven of the cases **Arsenobenzol** intravenous injections were combined with this treatment with good effect, the doses being 13, 30, 45, and 60 cgrms. respectively, given at six-day intervals.

Heymann⁶ reports a series of five cases treated with **X rays**, in which cure was effected within four weeks of the first application, a result which compares favourably indeed with all other methods. The routine of application is thus described: Distance from the ampoule, 15 cms.; number of rays, 7 to 8; intensity in the secondary, 1 ma.; duration of exposure, 15 minutes. Simple dressings were applied after each exposure, of which the average number required was four, repetitions being made every three days or so. A very satisfactory feature of the treatment was the early relief of pain.

Greig and Maitra⁷ report a series of nineteen cases (sixteen of whom were native soldiers) of chronic ulceration, showing in each case hyphomycetous fungus, at least three species, *penicillium*, *aspergillus*, and *monilia*, being identified. It would seem in all the cases to have been a secondary infection of an abrasion or wound, intractable ulcers resulting from the infection, which resisted local treatment, but speedily improved on the exhibition of **Potassium Iodide** in doses of from 10 to 20 gr., the usual average being 15 gr. three times a day.

REFERENCES.—¹*Bull. Soc. Path. Exot.* 1918, July, 616; ²*Bull. Soc. Méd. Chir. Indo-China*, 1918, June, 13-18; ³*U.S. Naval Bulletin*, 1918, Jan., 80; ⁴*Philippine Jour. of Sci. (sect. Trop. Med.)*, 1918, July, 165; ⁵*Le Caducée*, 1917, Aug. 15, 191; ⁶*Arch. d'Elect. Méd.* 1917, Aug., 375; ⁷*Ind. Jour. Med. Research*, 1918, Jan., 481.

URETER, DISEASES OF.

J. W. Thomson Walker, M.B., F.R.C.S.

Soresi¹ describes a method of anastomosis of the divided ureter the object of which is to prevent stricture at the point of union. The divided ends "are juxtaposed for about 1 cm., and are slit on the anterior wall." There are then six edges, namely, four straight edges of the slits, and two circular edges of the cut ends. When these are sutured—each edge to that immediately opposite in sequence from above or from below—an oblique union which is a combination of laterolateral and terminolateral anastomosis results. The method had been tried on one patient, but the final result was not given.

Blair Bell² makes a note on a method of dealing with the divided ureters when implantation into the bladder is impossible, or when that viscus is absent, that is, in ectopia vesicæ, or where total extirpation of the bladder is indicated for new growth. A loop of the lower ileum about 18 in. long, with its mesentery, is isolated, the continuity of the intestinal tract being re-established by anastomosis. The apex of the isolated loop is attached to the bladder, and the two ends are brought to the surface through a wound in each iliac region. This loop is washed through until it is aseptic, and the divided ureters are implanted into it at a subsequent operation.

In an exhaustive article on obstruction of the ureter, Geisinger³ states that cases may be divided into two classes: (1) The ureteral condition is incidental, the main lesion being elsewhere, within or without the urinary tract; (2) The ureteral obstruction is the principal lesion. The author deals with the second class, and gives the following as the principal factors in etiology: (1) Infection of the ureter secondary to some distant septic focus such as tonsillitis; (2) Excessive mobility of the kidney associated with fascial bands or aberrant blood-vessels; (3) Renal infection; (4) Pelvic operations; (5) Traumatism, or infection resulting from the passage of calculi; (6) Cicatures, resulting from appendicitis or pelvic inflammation; (7) Hypertrophy of the bladder. The symptoms are very variable, and the conditions most frequently simulated are chronic appendicitis, cholecystitis, lumbago, sacro-iliac disease, post-operative adhesions, and neurasthenia.

Leo Buerger⁴ draws the following conclusions from a study of an obscure case of bilateral ureteral calculi: The collection of clear urine from one kidney does not exclude ureteral calculi even of considerable size, nor does the absence of obstruction to the passage of a ureteral catheter exclude such calculi. A shadowgraph catheter may not be in contact with the shadow of a ureteral calculus if the ureter is dilated. A ureteral catheter may form a loop in a dilated ureter, without giving a sensation of obstruction during its introduction. The shadows of ureteral calculi in a dilated ureter may lie in unexpected positions other than in the normal line of the ureter.

REFERENCES.—¹*Surg. Gyn. and Obst.* (abstr.), 1917, Dec., 569; ²*Lancet*, 1918, i, 838; ³*Ann. Surg.* 1917, Dec., 654; ⁴*Med. Rec.* 1917, ii, 1020.

URETHRA, DISEASES OF.

J. W. Thomson Walker, M.B., F.R.C.S.

In an exhaustive article on modern operations for hypospadias, Thompson¹ describes fully the etiology of this congenital defect. Discussing indications for operations, he states that cases of the perineal variety with undescended testicles are both impotent and sterile. There can be no real reason, apart from sentiment, to advise an operation. On the other hand, if there is reasonable ground for believing that the patient is virile, the operation is justifiable and imperative. In the glandular variety the propriety of operating is doubtful except in selected cases. Where there is much deformity from bowing, an operation for connecting this and forming a new urethra should be performed. Surgical procedures in the penile and perineoscrotal varieties are always justifiable. The most suitable age is from the sixth to the ninth year. For cases of glandular and anterior penile hypospadias, the author favours operations which consist in using flaps taken from the prepuce and penis, and he prefers that of Mayo, which employs a single flap with the pedicle above, on the dorsum of the prepuce. For operation on the posterior, penile, and perineal varieties, he prefers Russell's stole method.

Ballenger and Elder² advocate the following technique for sealing injection fluid in the urethra. About 25 min. of the fluid are injected into the canal after passing water. The meatus is compressed with the left thumb and fore-

finger, and dried. Collodion is then applied with a camels-hair brush over the meatus and the glans penis for $\frac{1}{4}$ in. around the meatus. The compression of the urethra should continue for five minutes until the collodion dries and feels hard. The urethra is then released, and the patient should not drink anything for a few hours, so that the fluid can be retained in the urethra for four or five hours. The treatments are repeated twice daily for five days if conditions are favourable. The chief indications for this treatment are fresh infection and prophylaxis.

Leguen³ has recorded a number of cases in which he made a permeable passage after a war wound of the urethra. Two cases were completely successful, and the result was fair in others. He obtained the mucous membrane from female patients requiring colpoperineorrhaphy. The strip of mucous membrane was wound around a bougie, the raw surface outside, and held in place with fine silk. It was introduced into a tunnel bored for it by a cannula in the subcutaneous tissue. The mucous tube is introduced with the cannula after withdrawal of the trocar. The dilatation of the new urethra is commenced on the seventh or eighth day. No retention catheter is used.

Captain J. Guthrie⁴ records a case of excision of urethral stricture followed by the use of a pedicled flap of dartos, a method described by Dr. Hochrein, of Chicago. In the patient there was perineal scar from an old peri-urethral abscess, and this led to a dense fibrous stricture. The stricture was exposed and dissected away, a broad flap of dartos was now cut in such a way as to leave the base attached in the vicinity of the point of the urethra corresponding to the most distant part of the stricture. This flap was $2\frac{1}{2}$ in. long and $1\frac{1}{2}$ in. broad, and its free end pointed towards the meatus. A rubber tube was passed through the meatus along the whole length of the urethra into the bladder. The skin flap was stitched to the cut ends of the urethra and folded over the tube, and the incision closed. Three weeks after the operation the tube was removed, and a number 14-17 Lister bougie was passed with ease six months after the operation.

REFERENCES.—¹*Surg. Gyn. and Obst.* 1917, Oct., 411; ²*Jour. Amer. Med. Assoc.* 1918, i, 834; ³*Paris Méd.* 1918, June 1, 423; ⁴*Brit. Med. Jour.* 1918, ii, 111.

URINE, ABNORMAL CONSTITUENTS OF.

John D. Comrie, M.D., F.R.C.P.

The presence of spirochaetes in the urine of cases suffering from pyrexia of unknown origin was described independently by Patterson¹ and by Stoddard.² Patterson found these spirochaetes especially readily by the Indian-ink method. They had the following characters: five to eight more or less regular turns, with tapering ends, and the organism lying straight, bowed, or in a semicircle. He found them with increasing frequency in the urine of cases suffering from relapses of trench fever during and immediately after the exacerbations of temperature. Stoddard found spirochaetes in the urine of soldiers with still greater frequency—40 per cent of men sick with various medical and surgical conditions, and 20 per cent of apparently healthy men. These included various varieties of spirochaetes, and Stoddard considers that some definite morphological or other difference must be established before any diagnostic value can be attached to any of these as regards the causation of trench fevers.

Some observations on the occurrence of Bence Jones' proteinuria have been made by Miller and Baetjer.³ They find that a protein body with reactions very similar to those described by Bence Jones in 1847 is much commoner than is usually supposed. This body coagulates at a low temperature (42° to 56° C.), dissolves partially on boiling, and becomes denser on cooling; the precipitate behaves in the same way with nitric acid; the protein does not

pass through a dialyzing membrane, a point in which it differs from albumoses and proteoses. As regards the significance of the presence of this substance in the urine, it may occur in seemingly healthy young persons, being then associated with arterial hypertension; but it is most commonly found when chronic nephritis and œdema are present; the writer thinks that more careful testing would probably reveal its presence more frequently.

REFERENCES.—¹*Brit. Med. Jour.* 1917, ii, 418; ²*Ibid.* 416; ³*Jour. Amer. Med. Assoc.* 1918, i, 137.

URTICARIA.

E. Graham Little, M.D., F.R.C.P.

Classification of Types.—Sutton¹ suggests the following classification as representing our present views of urticaria. He includes, it will be noted, urticaria pigmentosa (*Plate XLV*), on the propriety of which inclusion opinion is still very divided:—

	U. factitia (dermographism)	{ Red White
U. acuta	U. papulosa	
	U. tuberosa	
	U. bullosa	
	U. hæmorrhagica	
	U. subcutanea (Willan. The urticaria œdematosa of Hardy.)	
Urticaria	U. gigans	
	U. recurrens (the urticaria evanida of Tilbury Fox)	
	U. perstans { U. perstans tuberosa U. perstans verrucosa (excluding prurigo nodularis)	
U. pigmentosa	{ Mast-cell type	{ Macular Nodular
		{ Maculo-nodular Vesicular
	Mast-cell-free type	

He reports a fresh case of urticaria pigmentosa in an adult, in sections of which complete absence of mast cells was to be noted. [As there was typical ordinary frequently recurrent urticaria, and it is claimed that "egg-white was probably the provocative factor," it is difficult to exclude the diagnosis of secondary pigmentation following upon urticaria, which is not the same thing as true urticaria pigmentosa.—E. G. L.]

Hartzell² gives a short review of the most important cases of urticaria pigmentosa recorded as beginning in adult life, and adduces two new personal cases, in both of which mast cells were found in typical abundance. He regards the pigmentation as wholly due to the pigment cells in the rete and corium, and in no wise affected by the presence of mast cells. He insists on the scanty or negative evidence of urticaria, and deprecates its inclusion in this group. Treatment is not mentioned in either of these papers.

REFERENCE.—¹*Jour. Cutan. Dis.* 1917, Nov., 749; ²*Ibid.* 756.

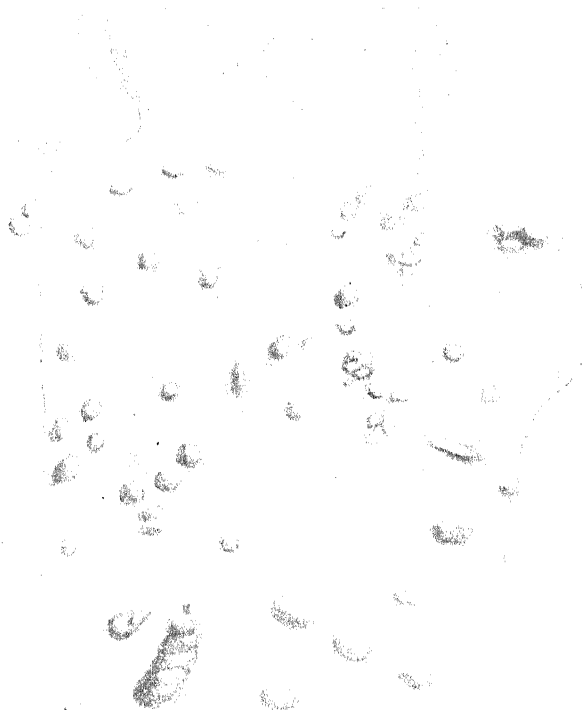
VACCINATION.

J. D. Rolleston, M.D.

Owing to the native practice in India of wiping away the lymph immediately after scarification, C. F. Fearnside and G. Poi¹ inject the lymph hypodermically, squeezing it from a leaden vaccine tube through an ordinary hypodermic needle which has been soldered to the cap of the tube. Four insertions are made. The usual focal reaction occurs, but there is no superficial vesiculation except when the needle has scratched the surface of the skin. To prove that the method was successful, the writers vaccinated by scarification twelve persons who had received these hypodermic injections, and the result was negative in each case.

PLATE XLV.

URTICARIA PIGMENTOSA



B. Graham Little

An intradermal method of vaccination is recommended by L. J. Wright,² on the ground that it yields a much higher percentage of 'takes' than the incision method, offers less chance for infection, and is the only method by which a definite and known amount of the virus can be deposited. One-tenth c.c. of a vaccine virus diluted with a glycerol-phenol solution is injected intradermically by a sterile tuberculin syringe and fine needle. Two injections are given, one being separated from the other by about an inch. The only disadvantage of the method is that twice as much vaccine is used in comparison with other methods.

REFERENCES.—¹*Ind. Med. Gaz.* 1918, 50; ²*Jour. Amer. Med. Assoc.* 1918, ii, 654.

VACCINIA, GANGRENOUS.

E. Graham Little, M.D., F.R.C.P.

Gangrenous ulceration of a vaccination scab is sufficiently rare to warrant notice of a case reported by Chalmers,¹ occurring in a European lady in Khartoum. She was vaccinated by the author with the fullest aseptic precautions which are described in detail. On the fifth day she became ill, and in the next four days developed very high fever (105°), and the site of vaccination had become a black slough two inches in diameter. On the thirteenth day she experienced an attack of acute gout of several joints, and the author attributes the gangrene to the effect of the suppressed gout, which is assumed to have been latent at the time of vaccination. The treatment adopted for the vaccination wound consisted in keeping the limb exposed to the air in an elevated position, with frequent applications of **Calamine Lotion**, a treatment which proved entirely satisfactory. The gout was treated by the usual therapeutic measures.

REFERENCE.—¹*Jour. Trop. Med. and Hyg.* 1917, Oct., 217.

VAGINA, DISORDERS OF.

W. E. Fothergill, M.D.

Vesico-vaginal Fistulæ.—R. Peterson¹ writes on substitution of the anal for the vesical sphincter in certain cases of inoperable vesico-vaginal fistula. He has collected 41 cases in which this line of treatment has been attempted. They date from 1851 to 1916, and 22 of them were done between 1881 and 1891, Morisani being responsible for half of the 22. Peterson regards the device as merely a way out of a difficulty when the vesical sphincter has been so injured that the restoration of its functions by plastic surgery is impossible. He has used it twice himself, and his former assistant, Cummings, has done it once. The vesico-vaginal fistula should be left or made large in order to avoid subsequent formation of calculi, which occurred in 4 of the 41 cases. The artificial recto-vaginal fistula should also be large enough to admit two fingers easily. The operation may be done in two stages: (1) Formation of recto-vaginal opening; and (2) Closure of vaginal and urethral orifices; or the whole may be done at one sitting. The patient retains the urine for from two to eight hours. The menstrual discharge passes per rectum with the urine, which does not causes diarrhœa, though the stools are usually somewhat softened. One or more formed stools are passed daily by most of the patients. There was no evidence in the 41 cases of any ascending renal infection, nor was there any infection of the uterus or appendages. The only case in which there was a fatal result was the first, operated on by Maisonneuve in 1851; the cause of death was septic phlebitis. It is probable that many patients would submit to this operation rather than wear a rubber urinal day and night for life.

The Bad Habit of Douching.—W. E. Fothergill² deprecates the habit of vaginal douching as begun by patients without medical advice, or continued for long periods without the knowledge or approval of the medical adviser.

It is pointed out that the so-called hot douche is generally a warm douche, because patients will not tolerate the use of water hot enough to constrict the blood-vessels. The warm douche increases pelvic hyperæmia, and thus aggravates most minor pelvic complaints and hæmorrhages. Its proper use is to promote absorption of comparatively recent inflammatory deposits by increasing pelvic hyperæmia. The writer's advice is summarized as follows: (1) Do not allow patients to douche themselves at all; but, when you have a definite reason for douching, let a nurse do it. (2) Do not use antiseptic douches unless there are germs to be killed in the vagina. (3) Remember that vulvitis is common but vaginitis is rare. (4) When you wish to apply antiseptic lotions to the vulva, tell the patient not to douche herself with the lotion, but to put it in a large bowl and sit in it. (5) Do not order hot douches (120°) in cases of menorrhagia and metrorrhagia. (6) Do not douche for leucorrhœa, either creamy or slimy. (7) Do not douche for aches and pains in the pelvis which are not due to pelvic infection. (8) Use warm douches (100° to 105°) as you would use poultices or hot fomentations, in cases of pelvic infection which are neither too acute nor too chronic to be improved by the production of temporary local hyperæmia.

REFERENCES.—¹*Surg. Gyn. and Obst.* 1917, Oct., 391; ²*Brit. Med. Jour.* 1918, i, 445.

VARICELLA.

J. D. Rolleston, M.D.

Michael¹ inoculated 32 children who had been exposed to chicken-pox. The inoculation, as in Kling's cases (*vide* MEDICAL ANNUAL, 1915, p. 674), was performed on the child's arm, the contents of a fresh vesicle collected on a flat spatula being thoroughly rubbed into a scarification $\frac{1}{8}$ in. in diameter. Of the 32, 7 developed the disease, 6 between thirteen and sixteen days after vaccination, and in 1 the date was not known; 8 developed lesions at the vaccination site between the tenth and fourteenth days, and 4 of these developed chicken-pox, which was severe in 1 case and mild in 3; of 3 who did not have vaccinal lesions, 2 had a severe and 1 a moderately severe attack. Michael's cases show that chicken-pox is inoculable, as 8 of the 32 cases developed lesions at the site of vaccination. The inoculation seemed to take place more readily in young children, as positive results were invariably under five years of age. The incubation period of thirteen to sixteen days in cases with a general eruption was shorter than the usual period of sixteen to twenty-one days. In 38 cases which had been exposed to chicken-pox, A. F. Hess and L. J. Unger² injected the contents of the vesicles intravenously. No local or systemic reaction occurred, and only one child subsequently developed chicken-pox. The application of lymph from the vesicles to the unbroken skin or mucous membranes failed to bring about immunity, although it produced no untoward symptoms.

Blauner³ records a case of *thrombophlebitis* of the inferior vena cava which developed seventeen days after a mild attack of chicken-pox in a boy of eleven. The symptoms were pain and swelling of both lower limbs; rigidity of the abdomen, with tenderness on deep pressure; enlargement of the liver; prominence of the superficial veins of the abdomen, which were still visible nearly five months after his discharge from hospital; and fever of an irregularly intermittent type.

W. P. Le Feuvre⁴ makes a plea for the recognition of a *common origin for chicken-pox and shingles*. In the course of three years he has observed seven cases of chicken-pox in children following shingles in one of the parents. There are 50 similar cases on record in the literature up to 1912. The points common to all were: (1) Chicken-pox in one individual following shingles in another within the ordinary incubation period for the former disease, i.e., within

twenty-one days; (2) No other source of infection except shingles discoverable; (3) By far the majority of cases showed shingles in an adult, generally a parent, followed by chicken-pox in a child. Three distinct types could be recognized: (1) Chicken-pox in one individual contracted from shingles in another—41 cases; (2) Shingles contracted from a case of chicken-pox—5 cases; (3) Shingles and chicken-pox existing in the same individual at one and the same time—4 cases.

B. Goldberg and F. D. Francis⁵ record three cases of herpes zoster and a simultaneous eruption of chicken-pox in adults of 27, 38, and 53 respectively, and quote other cases from literature. In Head's case a boy developed zoster in the fifth dorsal region, and within twenty-four hours a typical chicken-pox eruption. Four similar cases were published by Corlett in adults, age 40, 44, 48, and 70 respectively.

REFERENCES.—¹*Arch. Pediatr.* 1917, 702; ²*Amer. Jour. Dis. Child.* 1918, ii, 34; ³*N.Y. Med. Jour.* 1918, i, 355; ⁴*Brit. Jour. Derm. and Syph.* 1917, 253; ⁵*Jour. Amer. Med. Assoc.* 1918, i, 1061.

VERTIGO: MENIÈRE'S SYMPTOMS. (*See also* DEAFNESS; AVIATION, THE EAR IN; LABYRINTH, AFFECTIONS OF.) *John S. Fraser, M.B., F.R.C.S.*

PATHOLOGY.—Graef¹ notes that vertigo was formerly classified as: (1) Aural; (2) Ocular; and (3) Essential or idiopathic vertigo. We are now well assured that in all cases of vertigo the inner ear contains the organ chiefly concerned. The majority of cases are due to faults in the vestibular mechanism itself or its associated paths. The body equilibrium is governed by the vestibular apparatus. (*See MEDICAL ANNUAL, 1918, pp. 591, for Examination of the Vestibular Apparatus.*) Graef wants to know if we are to be content in the future to make the old guess-work diagnosis of gastric, cardiac, hepatic, or essential vertigo. Would it not be better first of all to make sure of the integrity of the static apparatus by means of the tests whose value is now well established. Irritation of the static apparatus resulting in vertigo may come from a great variety of sources. The vertigo of anæmia, plethora, neurasthenia, fever, and digestive troubles is explained by toxic effects. The vertigo of railway sickness and seasickness is probably due to impressions on the static labyrinth received both through the body motion and the attempt of the eyes to adjust themselves to the rapidly changing scenes. Closing the eyes and lying quietly back with the head fully extended is certainly the best cure for it. The eye with its faults of muscle balance, uncorrected or wrongly corrected refraction, etc., comes a close second to the ear itself as a source of troublesome vertigo. Careful study of the eyes should therefore always follow the ear tests in every case. Arteriosclerosis occupies a prominent place, also climacteric and traumatic neuroses—especially head injuries. Toxic conditions may be divided into two classes: (1) Toxins producing temporary effects in the labyrinth and associated nerves. Alcohol and tobacco are familiar examples of this; they probably cause some neuritis of the eighth nerve. (2) Toxins causing some definite and lasting damage to the ears. Syphilis, the exanthemata, focal infection, and auto-intoxication from the intestines or renal apparatus are examples. Vertigo may also come from a tumour in any part of the brain, most often from cerebellar tumours.

Shambaugh² holds that we meet with three distinct types of primary degeneration in the labyrinth: (1) Where the cochlea alone is involved, producing nerve deafness and more or less tinnitus; (2) Where the vestibule is involved simultaneously with the cochlea, producing occasional attacks of vertigo in addition to deafness and tinnitus; (3) Where the vestibular nerve alone is affected, and where all symptoms may be absent except occasional

attacks of vertigo. In many cases the degeneration is accelerated by acute exacerbations.

Primary degeneration of the labyrinth is not infrequently a complication of syphilis, both hereditary and acquired. It is observed also as a sequel of the infectious fevers, especially mumps. In a large percentage of these cases of primary disease of the internal ear the etiology has not been accounted for. Shambaugh has suggested focal infection as a possible cause, especially when the involvement of the labyrinth is associated with other evidences of systemic infection of focal origin, such as rheumatism or neuritis.

SYMPTOMS.—Courtenay Yorke³ gives a good description of Menière's symptoms; Male, 51 years, has never smoked or taken alcohol, never had syphilis or any serious disease. In May, 1913, he had an attack of vertigo and sickness. Six weeks later he had a second attack, which left him with nausea and giddiness for three days. The attacks recurred every month, coming on suddenly and lasting for several minutes to several hours. The typical attack was ushered in with a feeling of 'seasickness,' which gave sufficient warning to enable him to lie down on the ground. Then the attack set in acutely with intense vertigo, nausea, and vomiting, and subjective sensations of the ground rising and objects rotating. During the attack he felt quite helpless, and was obliged to lie motionless, with the eyes closed, as the slightest movement, or any attempt to look at objects, greatly aggravated the symptoms. Following the attack, a state of prostration ensued, and a sick, dizzy feeling often lasted for several days. In August, 1914, while blowing the nose, he became suddenly deaf in the left ear, with the onset of loud tinnitus. Previously he had observed nothing abnormal with the hearing. The deafness on the left side soon became almost complete, and the Menière attacks now steadily increased in frequency and severity. The general health became impaired, and he lost weight. In February, 1917, he had two attacks of unconsciousness, which lasted one or two hours. Yorke first saw the patient in March, 1917. Cochlear function: Left ear—almost completely deaf; loud voice close up to ear; bone conduction markedly reduced; Rinne negative; Weber to right; drum normal. Right ear—bone conduction slightly reduced. Rinne positive; drum normal. Vestibular function: No spontaneous nystagmus; no Romberg's sign; both labyrinths gave normal reactions, the left, however, being somewhat more sensitive than the right. Yorke held that the Menière paroxysms were occasioned by slight vascular changes acting on a vestibular end-organ rendered morbidly sensitive. The hearing on the left side was, for all practical purposes, lost. The symptoms were steadily becoming worse, and the patient's life was becoming intolerable.

Operation was performed, and the labyrinth on the left side completely destroyed. Subsequently the patient exhibited the typical clinical picture which results from traumatic destruction of one labyrinth. The hearing on the left side was entirely absent and the tinnitus greatly reduced. Vertigo and nystagmus steadily diminished, and the sense of balance became restored. Within three months he was able to do light work, but anything causing head congestion, such as stooping or lifting, produced vertigo. A year and a half after the operation the patient stated that he had never vomited nor had any return whatsoever of the old attacks of dizziness. He could cycle with ease, while the tinnitus in the operated ear was much subdued.

Aural surgeons of late years have clearly drawn the distinction between Menière's disease, produced by hæmorrhage into the labyrinth, occurring suddenly in patients without previous ear trouble, and Menière's symptom-complex arising from an affection of the middle ear. The distinction is not universally understood, and there is in consequence a tendency for any such patient to

be regarded as having an incurable ear disease. Hovell¹ finds that many of these patients have a furred tongue, nasopharyngeal catarrh, hypertrophic rhinitis, flatulency, and constipation, although sometimes the motions are broken and light-coloured. Previous to an attack the motions have been especially offensive, with blood-pressure often high and some dilatation of the heart. Oral sepsis due to pyorrhœa, decayed teeth, crowns, or bridges, must not be overlooked. Closure of the Eustachian tubes is usually present. Hovell urges that the presence of Menière's symptoms should suggest the existence of gastro-intestinal derangement, rather than an incurable condition of the ear.

TREATMENT.—**Gastro-intestinal Antiseptics**; medicines for reducing blood-pressure and correcting digestive derangement; washing out the stomach with an alkaline solution; a specimen may be obtained from the stomach during fasting, and a **Vaccine** prepared as an adjunct to other treatment. Local measures must not be neglected, i.e., the patency of the Eustachian tubes should be restored. Injection through a catheter of a few drops of **Collosol Argentum** is often followed by beneficial results. To lessen the nasopharyngeal catarrh, *collosol argentum* or *collosol iodine* is useful, sprayed directly backwards through the nostrils by an all-glass or vulcanite spray-producer. Banks-Davis recommended **Nitroglycerin** or **Nitrite of Amyl**, and remarked that an important part of the treatment was to put the patient to bed. Albert Gray has found that subnormal blood-pressure is the more common cause of Menière's symptoms than is high blood-pressure. He advises **Suprarenal Extract**. These cases are more frequent during war time, especially when there have been sleepless nights and a wearing anxiety. Goldsmith urges the importance of a microscopic analysis of the urine for granular or hyaline casts. Urban Pritchard holds that we must not forget the most common type—the epileptiform cases of Menière's vertigo; in these there is no middle-ear trouble at all. He recommends **Bromides** or **Hydrobromic Acid** in large doses—40 min., well diluted. Tilley got good results from 30-min. doses of **Ernutol** in one patient: he agrees with Gray that these cases seem to be extraordinarily frequent just now. He has found the combination recommended by Hughlings Jackson excellent, namely 5 gr. **Iodide of Potassium**, 10 or 12 gr. **Bromide of Potash**, in 2 dr. of the **Syrup of Glycerophosphates**. When tinnitus is troublesome, 15 min. of tincture of **Jaborandi** is a useful addition to the above prescription. Lake advocates, for cases with high blood-pressure, **Calomel** and **Bromides**; those with low blood-pressure need **Ergotin**. Hill sends doubtful cases to the physicians, trying to persuade them that the cases are of a cardiac and gastric nature, but they return, the medical treatment being disappointing. Kingston Barton finds that the vertigo specially distresses the patients. The method thirty years ago was to give large doses of **Quinine**, which made them very deaf, and then they got well. Kelson mentioned excessive tobacco smoking as a cause for Menière's symptoms. Sydney Scott reports the case of an officer of the R.A.F. suffering from unilateral Eustachian obstruction sufficient to lead to vertigo without deafness. On ascending to 9000 feet he became dizzy, but felt quite well at 4000 feet. Dundas Grant says that when the vertigo is due to latent epilepsy, it is relieved by **Bromide of Potassium**; when due to arteriosclerosis, by **Iodide of Potassium**; when due to injury, he has seen it considerably relieved by **Perechloride of Mercury**. When due to irritability of the vestibular nerve, minute doses of **Quinine** will produce a beneficial effect. Davis has taken the blood-pressure of many cases of tinnitus, and found it varied from subnormal to supernormal. He could not establish any relationship between the blood-pressure and the tinnitus.

REFERENCES.—¹N. Y. Med. Jour. 1918, i, 241; ²Ann. Otol. Rhinol. and Laryng. 1917, Sept. 685; ³Brit. Med. Jour. 1918, ii, 429; ⁴Jour. of Laryng. Rhinol. and Otol. 1918, Dec., 367.

VIBRATORY SENSATION, THE.*J. Ramsay Hunt, M.D.*

J. L. M. Symms¹ has devised a method for estimating the vibratory sensation which appears to have a distinct value in detecting the early stages of diseases affecting the sensory pathways. The history of the vibratory sensation began with a work by Rumpf, who collected a series of tuning-forks with vibrations varying from 13 to 1000 per second, and investigated how different parts of the body responded to the various stimuli. In 1895 Treitel conceived the idea of testing the sense of touch in the same way. He used one tuning-fork of 128 vibrations, and examined with it the different parts of the body, finding how many seconds elapsed before the sensation ceased to be felt. Treitel took the time during which the vibrations were observed at different points of the body: skin of head, 8 seconds; skin of face, 7 to 8 seconds; skin of nose, 9 to 10 seconds; and finger-tips, 18 to 20 seconds. The vibrations are felt over the arms between 7 and 16 seconds, over the legs between 6 and 10 seconds. During the next fifteen years there were various contributions. Treitel, Bing, Egger, Rumpf, and others wrote on the subject, but their work was chiefly confined to experiments on the nature of the sensation. In 1905 R. T. Williamson took the subject beyond the experimental stage, and showed the clinical value of the vibratory sensation in diseases that involve sensory paths. In Symms's investigations, which date from 1911, he used a tuning-fork obtained from Messrs. Down with a vibration rate of 108.75. Two pieces of steel are attached to the upper portion of the fork in such a manner that when the arms of the fork are vibrating, a small window is seen between them. This disappears when the vibrations of the fork reach a definite amplitude. At this moment, when the window disappears, he applies the fork to the subcutaneous bony point and starts a stop-watch. The patient is instructed to give a signal at the moment when he ceases to appreciate the vibration. The watch is then stopped and the time recorded. By this method the fork is always applied when it is vibrating at a definite amplitude. The subcutaneous bony parts taken are the internal malleolus, external malleolus, tibia, anterior superior spine of the ilium, sternum, radius, and ulna. By this method, on thirty normal individuals between the ages of 18 to 30, he determined at each bony point what intervals of time elapsed before the sensation disappeared. The mean intervals, in seconds, together with the maximum and minimum for these thirty individuals, are shown in the following table:—

	Mean	Maximum	Minimum
Internal malleolus	27	35	25
External malleolus	28	38	25
Tibia (middle of shaft, inner aspect)	29	37	25
Anterior superior spine of ilium..	21	25	16
Sacrum	20	23	15
Sternum	30	36	24
Radius (lower end)	34	40	28
Ulna (lower end)	34	32	28

When this test is applied to patients suffering from impairment of the vibratory sensation, a numerical ratio to the mean normal is obtained which represents the degree of impairment of the sensation. This can be described graphically on a diagram, the heights in which represent the time during which the sensation is appreciated by the normal individual.

In peripheral neuritis due to diabetes, alcohol, or lead, he invariably found

a diminution in the sensation, which, however, differed in distribution in the different types. In *tabes dorsalis* the vibratory sensation is found to be diminished over the lower limbs and over the sacrum. In his series of tabetic cases (15) the degree of Rombergism present was found to be in proportion to the depreciation of the vibratory sensation. The early cases of tabes, in which the only signs were Argyll Robertson pupils, positive Wassermann reaction of cerebrospinal fluid, and absent ankle-jerks, showed a similar diminution in the vibratory sensation. In disseminated sclerosis there was a diminution in the vibratory sensation over the sacrum in all cases, but the diminution over the limbs was not constant, one or more limbs being involved uniformly. This diminution over the sacrum appears only to be present in diseases involving the spinal cord. In the motor neurone diseases, amyotrophic lateral sclerosis, progressive muscular atrophy, and paralysis agitans, the vibratory sensation is normal.

The nature of the sensation is somewhat obscure; the probability is that we are dealing with a multiple pressure sensation, and the sensation is the result of a summation of pressure stimuli. If the skin is rendered insensitive, 20 per cent of the sensation is cut off, pointing to the fact that part of the sensation is transmitted by the paths of cutaneous sensibility. The remaining 80 per cent appear to follow the paths of deep sensibility.

The reason for choosing bony points for the application of the stimuli is that the bone acts as a 'sounding board,' transmitting the sensation to a variable distance round. This is well shown by the tongue, which, although a highly sensitive organ, does not appreciate the vibration as well as the wrist, the tissues of the tongue being less resistant and having no bony base to spread the vibrations.

REFERENCE.—¹*Quart. Jour. Med.* 1917, 32, and *Lancet*, 1918, 217.

VINCENT'S ANGINA.

P. Watson-Williams, M.D.

The growing literature of Vincent's disease (a term preferable to that of Vincent's angina, which erroneously suggests that it is limited to the throat) corresponds with the clinical evidence that the infection is not only much more prevalent than hitherto believed, but is also a serious disease, and at times fatal. Taylor and McKinstry,¹ in their serological investigation of the disease, base their observations on a bacteriological examination of more than 300 cases of fuso-spirillary infection at the Queen Alexandra Military Hospital, of which about 50 per cent were typical cases of Vincent's angina verified by bacteriological findings. Taking at random 55 cases of the 300,² the Wassermann reaction test yielded no observation of fixation of complement, with the exception of two cases, and in each of these a history of chancre contracted ten years previously was admitted. Taylor and McKinstry state that as a result of this investigation and of a careful and critical consideration of cases recorded in the literature, they came to the conclusion that *the prevailing belief in the occurrence of a positive Wassermann reaction in Vincent's angina has no foundation in fact*, that the two conditions can be differentiated with absolute certainty by bacteriological and serological methods, and that when a Wassermann test is positive in cases of Vincent's angina a double infection exists.

Two interesting cases are recorded by Greeley: (1) A man, age 27, developed a typical membrane covering both tonsils and soft palate, the entire pharynx from the glottis to the posterior nares, and extending into both nostrils. The history suggests that he had been infected for years, and the constitutional symptoms were but moderately severe when Greeley observed him. Ten per cent applications of Silver Nitrate were made, but on the second day, when

the case had already begun to improve, autogenous **Vaccines** were begun, 1,000,000,000 bacilli to 1 c.c. The first dose of 5 c.c. was followed by marked local and slight constitutional reaction. Three days later a second dose was administered, with similar reactions. The patient rapidly improved, and was well by the tenth day. (2) A physician, age 43, with a history of a former chronic nasal septal ulcer. Two months before Greeley observed him, the patient had developed a heavy membranous ulceration on his left tonsil and a general purpuric rash. A vaccine, 1,000,000,000 to 1 c.c., was prepared, and a 2-c.c. dose was followed by marked local reaction and bleeding of the gums, and on the second dose a purpuric eruption, also over the body; hence the vaccine was suspended. Later, bronchitis supervened, with Vincent's bacilli and spirilla in the sputum, headaches, and pain in the shoulder, and a few days later the patient died. Greeley considered that the patient died from Vincent's angina infection.

Nolf, Colard, and Spehl³ record a case of well-marked diffuse Vincent's infection of the cheeks, gums, teeth, and tongue, which was associated with numerous bright carmine patches with a livid red centre, very variable in size, from 2 mm. to patches the size of a two-franc piece, and distributed on the legs, scrotum, forearms, etc., and there was diffuse conjunctivitis, with mucopurulent discharge. Another case displayed cutaneous vesicles recalling exactly small-pox vesicles, but with a diffuse redness around more extensive than in small-pox, and on the palms of the hands the vesicles were more like pemphigus. The vesicles were widely scattered over the face, body, and limbs. The reporters state that under the influence of **Salvarsan** medication the cutaneous and mucosal lesions rapidly receded.

Hubbard⁴ recommends **Perborate of Sodium**, in powder, as advised by Stark, as being the best local application in Vincent's disease, with a mild non-irritating gargle like **Dobell Solution**, and **Glycerole of Iodine**, applied only to necrotic or false-membrane areas. In cases that do not yield promptly to this treatment, he gives **Cacodylate of Sodium**, 2½ gr. to 5 gr., repeated in twenty-four or forty-eight hours (if the kidneys are not affected). In the malignant type, not improving under the above treatments, give **Neosalvarsan** 0.6 grm. (in an adult of average body-weight) intravenously. Hubbard considers that in ulcerative cases the extent of the necrosis often accounts for the futility of local applications; the objection to strong antiseptics is that we are liable gradually to extend the area of invasion by destroying normal marginal tissue. He refers to several fatal cases attended with deep ulceration.

Carroll⁵ advises that, if the tonsils are attached, all crypts should be opened thoroughly to promote drainage, the membrane removed, the surface dried with cotton, and applications made of **Mono-chlor-acetic Acid**, or **Iodine** or **Chloride of Iron in Glycerin**, or **Nitrate of Silver**. He condemns excision of the necrotic parts and the exhibition of mercury, even in syphilitics, until after the angina is checked. Carroll reports one fatal case.

REFERENCES.—¹*Brit. Med. Jour.* 1917, i, 421; ²*Jour. Laryngol. Rhinol. and Otol.* 1918, Oct., 289; ³*Arch. Méd. Belges*, 1917, Sept., 802; ⁴*Laryngoscope*, 1917, Nov., 789; ⁵*Ibid.* Oct., 763.

VISION, DISTURBANCES BY CEREBRAL LESIONS.

R. Foster Moore, F.R.C.S.

Gordon Holmes¹ presents an important contribution to the knowledge of the cortical representation of the retina, in continuation of his work on this subject already published. The clinical material is derived from cases of gunshot wounds in which the occipital lobes of the brain are involved. This second collection of cases serves to confirm in every particular the conclusions

which were arrived at previously. The following is a curtailed summary (see Fig. 140 :—

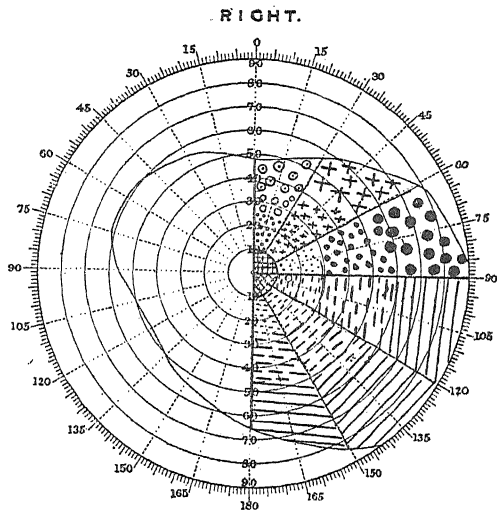
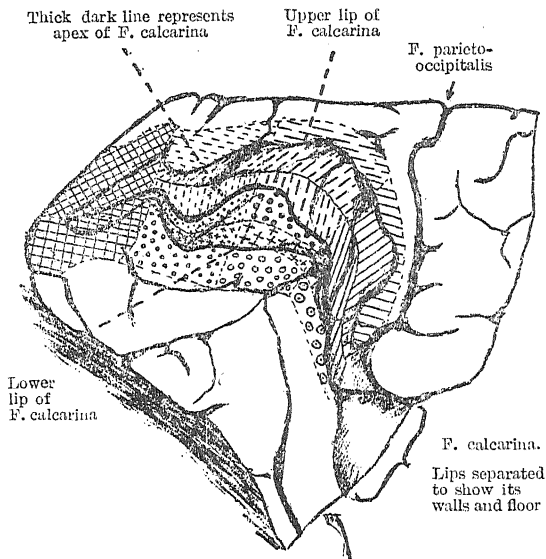


Fig. 140.—Showing the probable representation of the different portions of the visual fields in the calcarine cortex. Above is a drawing of the mesial surface of the left occipital lobe with the lips of the calcarine fissure separated to show its walls and floor. The markings on the various portions of the visual cortex which is thus exposed correspond with those shown on the chart of the right half of the field of vision. This diagram is merely a schema. (By kind permission of the 'British Journal of Ophthalmology'.)

1. The upper half of each retina is represented in the dorsal, and the lower in the ventral, part of each visual area.

2. The centre for macular or central vision lies in the most posterior part of the visual cortex, probably on the margins and on the lateral surfaces of the occipital poles. The macula has not a bilateral representation.

3. The centre for vision subserved by the periphery of the retinae is situated in the anterior portions of the visual areas.

4. Those portions of the retinae adjoining their vertical axes are probably represented in the dorsal and ventral margins of the visual areas, while the retina in the neighbourhood of its horizontal axis is projected on to the walls and the floor of the calcarine fissure.

5. Severe lesions of the visual cortex produce complete blindness in the corresponding parts of the visual fields.

6. The defects in the visual fields of the two eyes are always congruous and superimposable.

7. Lesions of the lateral surface of the hemispheres, particularly of the posterior parietal regions, may cause certain disturbances of the higher visual perceptual functions with intact visual sensibility, as loss of visual orientation, disturbance of the perception of depth and distance, visual attention loss, and visual agnosia.

In a further paper on *disturbances of visual orientation*, Holmes² gives a careful analysis, with deductions, derived from the examination of six patients who had sustained perforating gunshot wounds of the head. With regard to the localization of the brain lesion which was responsible for the defects: In all the six cases both hemispheres of the brain were injured, and this, Holmes believes, is essential to the production of the symptoms. Secondly, in all cases the lesion on the lateral surface of the hemisphere probably involved the angular and supramarginal gyri, and extended into the adjoining occipital, temporal, and parietal convolutions. The deeper parts injured by the continuance of the course of the missile are not certain, but wounds of the mesial surface of the hemispheres probably all lay in the region of the splenium. There were defects of the visual fields in all the cases, which were probably due to damage to the optic radiations. Evidence is produced which points rather strongly to the characteristic symptoms being due either to the damage to the cortex on the lateral surface of the brain or to the immediately underlying fibres. The symptoms are not due to paralysis of the ocular muscles, lack of fixation, nor the defects of the visual fields which were present.

The symptoms produced by these lesions can best be indicated by reproducing those present in one case. There was disturbance of ocular movements; difficulty in fixing objects and maintaining fixation on moving objects; imperfect or incorrect movement of the eyes to order; and the absence of accurate convergence and accommodation and of the visual blinking reflex. There were disturbances in visual localization and orientation in space. The patient was unable to indicate correctly the position in space of objects which he saw distinctly. He was unable to recognize immediately and correctly the relative positions of two objects in space, and to determine the relative length of two lines or the relative sizes of two objects. The cases are quoted in detail.

Recovery of Fields of Vision in Concussion Injuries of the Occipital Cortex.—M. L. Hine³ makes a distinct contribution to the knowledge of the recovery of function of a particular part of the brain cortex after a concussion injury. The cases have been carefully chosen and examined, and carefully worked out. The paper should be read in its entirety. The following are some only of the points established: In the case of an injury at the occipital pole, the

hemianopia is very frequently complete, the macula included, macula escape being much less frequent than in hemianopias as seen in civil practice. The visual fields are restored by recovery from centre to periphery, in contrast to the mode of recovery when there is loss of cerebral substance. The visual field is restored in the upper quadrant before the lower. As recovery takes place, white objects are recognized before coloured ones; consequently, in examining a mild case, or one in which considerable progress towards recovery may have occurred, a coloured test object should be used. On the other hand, in the more slowly recovering cases with subdural or extradural hæmorrhage, this separation between colour and white appreciation does not appear to hold.

REFERENCES.—¹*Brit. Jour. Ophth.* 1918, July, 353; ²*Ibid.* Sept., 449; ³*Ibid.* Jan., 12.

VULVO-VAGINITIS IN CHILDHOOD. *Frederick Langmead, M.D., F.R.C.P.*

Gittings and Mitchell,¹ while emphasizing the resistance to treatment of this obstinate affection, review some of the methods which have been recommended, and which involve the use of local remedies, and vaccines and general constitutional measures. Adkins, although believing that the disease runs its course in spite of all therapeutic efforts, finds that local measures confer a temporary benefit. Among these is the injection of suspensions of *Liv. ng Lactic Acid Bacilli*. This plan has also been adopted in eight cases by Whitehouse, who obtained cessation of discharge and disappearance of gonococci and septic organisms in from fourteen days to three weeks, but cannot say whether the results were permanent.

H. Taussig believes in rest and general tonic treatment, but not in irrigations, preferring instillations of *Argyrol* (25 per cent) in the early stages, and *Silver Nitrate* (1 to 4 per cent) later. *Silvol* he has also found useful. G. G. Smith advocates mechanical cleanliness by irrigations of *Potassium Permanganate* (1-4000) and the prolonged use of silver salts such as argyrol or silvol. He continues the treatment for one month after all discharge has ceased. Perrin has treated over 100 cases during the last ten years with injections of *Protargol* 5, water 8, glycerin q.s. ad 50, and claims that all were cured within fourteen to twenty days, although most of them were chronic and had received a variety of forms of treatment. Most elaborate and heroic is the method employed by Norris. The child is put in the Sims position, and the vagina washed with weak *Pot. Permang.* and swabbed with 25 per cent *Argyrol*. It is then dried with strips of gauze, the drying being completed by the use of an empty atomizer. The hymen is usually sacrificed in this procedure. The child is kept in the same position for twenty to thirty minutes to allow air to enter the vagina. Finally the vagina is flooded with a weak solution of *Silver Nitrate*, gradually increased in strength and combined with glycerin. This treatment is carried out three times weekly. In the intervals the mother or nurse uses a weak permanganate or argyrol solution introduced by a soft rubber ear syringe. A cure followed in fourteen cases after an average period of twelve weeks. Wilcox, after trying all forms of treatment, considers that the disease can be controlled but not cured. Fisher has abandoned all treatment other than the use of irrigations of *Magnesium Salts*, *Alum*, and water, combined with restoratives such as change of air, arsenic, cod-liver oil, and iron.

Rubin and Leopold insist on the employment of a female urethroscope to determine the extent of the lesions before commencing treatment. When irrigations are resorted to, the douche tips should enter the vagina for at least 1½ in. Swabbing without the aid of the urethroscope is injurious and valueless. When strong silver solutions are applied to the cervix and vagina, it is advisable to keep the child in bed for a few days. Urethroscopy is also advised by Barnett, to ensure proper application of the remedy directly to the cervix.

He prefers **Lugol's Solution** (1-500). By this means he obtains cure in a month, whereas at the end of six months only 7 of his 26 patients undergoing prolonged systematic treatment were cured by ordinary irrigation. Freeman believes in varying the local treatment, and also uses the endoscope.

Vaccines are advocated by B. W. Hamilton, who treated 84 patients, and obtained a cure in 90 per cent in an average period of fifty days. These he contrasts with 260 patients treated by irrigation alone, of whom 60 per cent were cured in an average time of ten months. He used two stock vaccines, and one freshly prepared from an eighteen-hour blood-agar culture taken from an adult male with urethritis.

REFERENCE.—¹*Amer. Jour. Dis. Child.* 1917, May (abstr. in *Theor. Gaz.* 1917, Sept. 15, 659.

WAR NEUROSES. (See NEUROSES, WAR.)

WARTS.

E. Graham Little, M.D., F.R.C.P.

Local treatment is still the most effective means of dealing with warts, and the following prescriptions may be found useful :—

R Salicylic Acid	2 c.c.	Collodion	30 grms.
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The wart should be touched with this solution two or three times a day, each time the film of collodion being removed.

A more sedative and as efficient a preparation is :—

R Chloral Hydrate	10 c.c.	| Collodion	30 grms.
Salicylic Acid	2 c.c.		

Also the following is suggested :—

R Calomel	1 gm.	| Wool Fat	20 grms.
Salicylic Acid	2 c.c.		

This should be applied to a wart two or three times a day.

A more active solution is :—

R Chrysarobin	2 c.c.	Collodion	30 grms.
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An anonymous writer recommends the application of fluid extract of **Arbor Vitæ** (P. D. & Co.)¹.

REFERENCE.—¹*Med. Press and Circ.* 1918, April 17, 293.

WHOOPIING-COUGH.

Frederick Langmead, M.D., F.R.C.P.

Considerable success has been claimed for **Bromoform**, but to most observers it has proved disappointing. Its failures have been ascribed by Neal Kitchens to wrong methods of administration. Allan,¹ writing from a considerable experience of its use, advises a dosage of 1 min., every four hours, to an infant of one year. Generally he follows Kitchens' method of giving 1 min. for each year of life up to five, but has found that for older children a smaller dose is quite effective and sufficient. Individual consideration is important, and in each case an endeavour should be made to obtain the maximum effect with the minimum dose. His usual formula for an infant one year old is : Bromoform, 1 min.; spirit of chloroform, 3 min.; mucilage, q.s.; aqueæ anethi, q.s. ad 1 dr.; and he has never experienced difficulty in getting children to take this mixture. It is often advisable to add a minim of tincture of strophanthus to the mixture, which should never be kept for more than twenty-four or thirty-six hours. The bottle should be shaken thoroughly before each dose, and accurate measurement should be strictly enforced, the domestic teaspoonful being too variable. When used in this way, he has found that the drug has a marked effect in reducing the severity of the paroxysms and their frequency. When the attacks diminish, and especially when they become less severe, the

dose may be reduced gradually. He does not assert that bromoform is always effective, but regards it as a most valuable remedy when suitably administered.

C. J. Boom² recommends **Vaccine** treatment, which he has employed in 66 cases, 40 of which were available for the purposes of his paper. He obtained better results from mixed than from simple vaccines, and advises a large initial dose, of not less than 1000 millions, except for children under one year or when the whooping-cough is complicated by other diseases, when he uses 500 millions. He increases the dose up to 4000 or 5000 millions, every other day, until one of the symptoms shows marked remissions; then twice a week until a cure has been effected. For prophylaxis also he advises large doses of from 1800 to 3800 millions. His experience of **Phylacogen** is limited to 4 cases, all severe and all discharged within two weeks. Patients suffering from asthma or from congenital syphilis do not respond readily. After the catarrhal stage is over, the vaccine will not shorten the duration of the disease, but will lessen the intensity of the paroxysms. The reasons given for the superiority of vaccine therapy are: slight reaction; average duration of twenty-four days; slight loss of weight; diminution of number and intensity of paroxysms after seven days; cessation of vomiting after one to two weeks; absence of complications in the 40 cases reported; mortality, nil. He urges that vaccine should be used as a prophylactic, as it has reduced institutional whooping-cough from 40 to 7 per cent.

E. S. Loge³ has used pertussis vaccine in about 100 cases with "most excellent results." Of 20 cases, only 2 did not respond to the treatment. Ordinarily he expects response after the second or third dose, and generally has not given more than five injections. He begins with a dose of 5 c.c. (60 million bacteria) of combined pertussis vaccine, and with each subsequent injection increases the dose by 0.1 to 0.3 c.c., never exceeding 120 million organisms. The second dose is usually given on the second day after the initial dose, and subsequent doses at intervals of three or four days. In dosage he is guided more by severity of the 'whoop' than age of the child. Most success attends the treatment in the early stages. He advocates the vaccine also in prophylaxis.

O. Cozzolino⁴ relates that of 345 children treated for whooping-cough at his dispensary at Cagliari, nearly 30 per cent were under twelve months, and only 58.3 per cent were over two years old. His experience confirms the general belief in the extreme contagiousness of the disease in the early catarrhal stage. Although some doubt that it is contagious after the first week, he thinks it safer to assume thirty days as the limit. From the fifth to the eighth week he has never seen it conveyed to other children in hospital. The greater predisposition of girls to the disease, in his experience, makes him regard it as different from what we know of acute infectious diseases in general. Cozzolino regards a change of air and scene as useful in eliminating the nervous and psychical factors which co-operate in maintaining the spasmodic cough.

REFERENCES.—¹*Prescriber*, 1917, Aug. (abstr. *Ther. Gaz.* 1918, Jan. 15, 31); ²*New Orleans Med. and Surg. Jour.* 1917, Sept. (abstr. *N. Y. Med. Jour.* 1917, ii., 667). ³*Ther. Gaz.* 1918, March 15, 159; ⁴*Pediatrics*, 1918, March, 129 (abstr. *Jour. Amer. Med. Assoc.* 1918, i, 1340).

WOUND TREATMENT.

W. I. de C. Wheeler, F.R.C.S.I.

SURGICAL DRESSINGS.

Almworth Wright, Fleming, and Colbrook¹ maintain that the surgeon who treats wounds with antiseptics assumes that the organism is unable to deal with the infecting microbes; but that the proper assumption would be that the organism *must* be competent to deal with every species of microbe, else there would be bacterial infection from which no one would recover. In a

most instructive paper it is stated that foul wounds should be treated by soaking the slough-covered walls with 5 per cent **Salt Solution**. This is allowed to dilute itself by diffusing out into the exudation which the hypertonic salt draws into the wound cavity. When the cleansing digestion is thus completed the salt continues to act as a lymphagogue. The following points in the paper are worthy of note :—

1. It has been erroneously inculcated that every wound should be sterilized before closure ; and that, therefore, *primary suture* should be avoided and *secondary suture* undertaken only after a course of antiseptics. There is now no question, with respect to primary suture, that the wound taken after early surgical cleansing and resection is as good as sterile ; and, with regard to *secondary suture*, undertaken with a wound in good condition and a purely serophytic infection, that such operative procedure, provided it leaves behind no infected dead spaces, directly contributes to sterilization.

2. It has been taught that we should judge of the fitness of the wound for closure by necro-pyo-cultures and direct microscopic examination of the pus. We have learned that it would be infinitely more reasonable to base our judgements upon the results of bio-pyo-culture.

3. It has been taught that suture cannot be successful in a wound containing a hæmolytic *Streptococcus pyogenes*. We have seen that leucocytes can, given proper conditions, successfully combat this, and of course all other streptococci ; and that these conditions can be realized in connection with the suture of wounds.

4. It has been taught that for the removal of sloughs from foul wounds chemical solvents are required. We have learned that sloughs can be removed by tryptic ferment set free from disintegrated leucocytes, and that the liberation of this ferment can be greatly accelerated by breaking down the leucocytes in the discharges with hypertonic saline solution.

5. Lastly, it has been taught in connection with antiseptics that sterilization is obtainable only by continuous or very frequently-repeated application. We have learned that there is nothing to prevent any part of a wound surface which has been washed quite clear of albuminous matter being sterilized by a single application of antiseptics.

There is so much difference of opinion as to the effects of the much-extolled antiseptics on war wounds, that it appears useless to attempt judgement. Major Dunne² makes the following observations :—

1. **Flavine**.—A number admitted from casualty clearing stations had been treated by flavine and Z paste, and had been kept by the casualty clearing station for a period of from six to ten days. The results were exceptionally satisfactory. The wounds in nearly all were closed ; in some the sutures had been removed, in others the sutures were removed in this hospital. Only two showed signs of inflammation ; one of these was a case of very severe multiple wounds, which would account for the incomplete operation performed. Where the patient can be kept under observation and an early and complete operation performed, this seems an ideal method of treatment.

2. **B.I.P.P.** cases did not arrive in the same satisfactory condition ; most were thoroughly septic. In my practice, with two exceptions, it was used only as a sequel to the Carrel-Dakin method when the wound surface had become flat or too small for the application of Carrel's tubes. In the latter part of the period it was replaced by chloramine 4 per cent in vaseline.

3. **Salt Pack** cases arrived bathed in foul-smelling discharge ; gas gangrene cases arrived with this dressing. Salt dressings were continued for a short time by one surgeon. *B. pyocyaneus* was a constant complication, and the hæmorrhagic granulations were a constant drain on the patient's vitality.

4. **Carrel-Dakin Method.**—Cases so treated invariably arrived in quite good condition ; if the complete operation had been performed and the technique strictly carried out, it was often difficult to realize that the patient was suffering from a dangerous wound.

Pearson,³ in a paper on the effects of flavine in wound treatment, concludes as follows :—

1. In cases where infection and sepsis are active and uncontrolled, the use of flavine following suitable operative measures has no beneficial effect on the subsequent progress of the case in so far as the control of sepsis is concerned. Any slight differences observed were unfavourable.

2. In cases where sepsis has already been controlled and repair has begun, flavine acts injuriously, chiefly by producing an unhealthy granulating surface.

While these conclusions do not prove that flavine may not possess powerful germicidal properties in certain experimental conditions, I believe they show that its clinical use is not attended with good results. Since completing my observations I have entirely abandoned the use of flavine in my work.

These conclusions were reached before the recent papers by Captain A. Fleming and Professor R. T. Hewlett were published, in which grave doubts are cast on even the experimental bactericidal powers of flavine. My observations furnish a clinical complement to the laboratory work of these authors.

Harpster¹ recommends **Paraffin Paper** for surgical dressing. He says it is far superior to paraffin dressing of burns by the spray method, is much more easily and rapidly applied, and more easily removed. The first dressing of pure petrolatum on paraffin paper is applied directly to the burn, and over this a layer of cotton-wool and a bandage. A change of dressing once in two or three days is sufficient. The paraffin paper can be procured at almost any store where groceries are sold.

Garlic applied locally (*p. 3*).

SUTURES.

It is recognized that catgut, however prepared and sterilized, will absorb rapidly under tension, and it is therefore necessary to reinforce catgut sutures by deep tension sutures of silk-worm gut, especially in high abdominal wounds. In addition to Michel's clips, light interrupted or continuous sutures are necessary to bring the skin edges into proper apposition.

Edmonds⁵ describes a combined deep and superficial skin suture, the employment of which saves considerable time. The diagram (*Fig. 141*) sufficiently explains the method. The edges are slightly elevated by the suture and

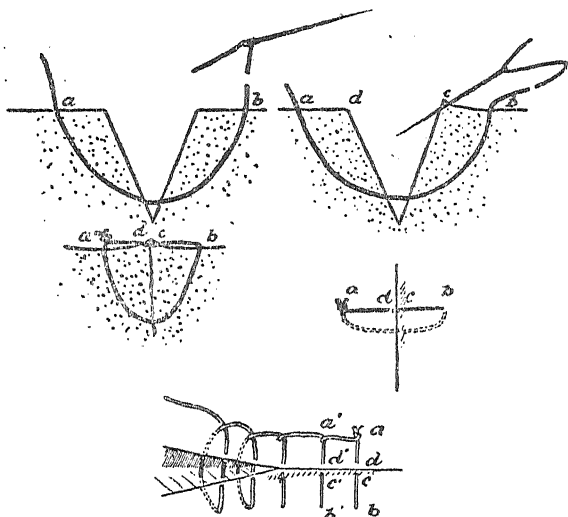


Fig. 141.—Edmonds' combined deep and superficial skin suture. (*From 'The Lancet.'*)

inversion is effectually prevented. The suture can be made either interrupted or continuous.

Tendon Suture.—Harmer⁶ urges the necessity of a strong suture for a divided tendon, which will endure very early use, and so prevent fixation by the later formation of connective tissue. The illustrations (*Fig. 142*) present the method employed by him. The stitch is of silk. The long ends tied alongside the tendon serve as lateral splints. They must not be tied too tightly, in order to avoid buckling of the tendon. In closing the wound the fascia and skin should be stitched separately, and no splint used. Active motion is started as soon as the patient has recovered from the anæsthetic.

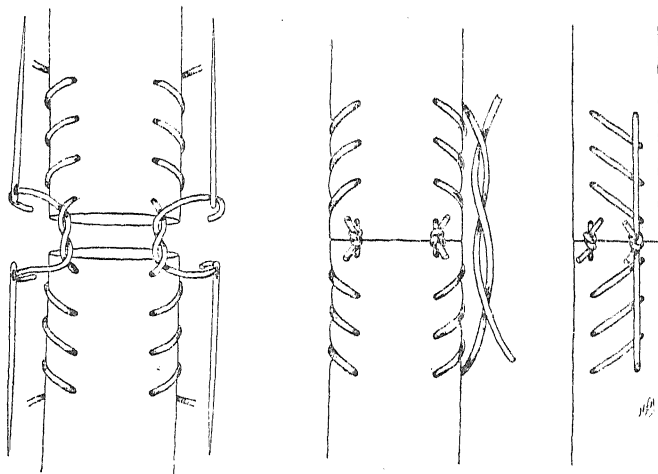


Fig. 142.—Harmer's method of suture for a divided tendon.
(Redrawn from 'The Boston Medical and Surgical Journal'.)

Fuld,⁷ on the other hand, describes a two-stage operation for tendon suture in the hand. The tendon is sutured in orthodox fashion, and six weeks later, when union is firm, the tendon is freed from adhesions by open operation, and movements are at once commenced. It would appear, however, that the method is more applicable to primary operations followed by bad results, and that the two-stage operation should not be the method of choice. The suture recommended in the primary operation is shown in *Figs. 143, 144*.

Primary and Delayed Primary Suture of Gunshot Wounds.—The success following primary and delayed primary suture of septic wounds after preparation by free excision, is one of the outstanding features of the surgery of the war. The method will be applicable in civil practice in a limited number of cases. On this subject a number of surgeons, under the directorship of Captain Forbes Fraser,⁸ make general observations.

The following classes of cases are unsuited for primary suture: (1) Patients who from shock or loss of blood are not able to bear a thorough cleansing operation. (2) Where infection has been established in the tissues surrounding the wound, i.e., the majority of cases whose arrival at the C.C.S. has been delayed beyond twenty-four hours. (3) Cases with multiple wounds. Success depends upon early operation, whereby the infected area may be thoroughly removed; also on the ability of healthy tissues to deal with a limited amount

PLATE XLVI.

GUNSHOT WOUNDS OF THE THIGH



High-explosive shell wounds of thigh, thirteen hours after infliction.

PLATE XLVII.—GUNSHOT WOUNDS OF THE THIGH—continued



Dissection required to clear away dead and infected muscle found in wound shown in *Plate XLVI*. Fourteen metallic fragments were removed by an electro-magnet. The infection was by hæmolytic streptococci, so that delayed primary suture could not be carried out.

of infection, and the possible destructive or inhibiting action of certain chemical antiseptics. Whether B.I.P.P., flavine, dichloramine-T., or other common antiseptics are helpful is not quite settled. Many good results are obtained without the use of any antiseptics. After preparation of the skin surrounding the wound, the narrow margin of skin edge is first excised, the wound is enlarged if necessary, and freely retracted. As little healthy tissue as possible is removed; the soiled, dead, or bruised tissue is snipped away until the healthy contracting and bleeding substance is exposed. In compound fracture, after treatment of the wound as above, foreign bodies are removed and sharp points of bone are cut away. Every bony crevice is carefully cleaned, the loose fragments are treated with respect, and allowed to remain if possible. The advisability of closing the wound or leaving it open must be judged in each individual case. Silk treated with B.I.P.P. will often be found the most convenient suture. On the whole it is best to avoid drainage. Either the wound should be completely sutured, and the deep and superficial tissues brought together, or it should be left completely open until the first dressing. Plates *XLVI*, *XLVII*, kindly furnished by the *British Journal of Surgery*, show such a wound in which primary suture was contra-indicated owing to the presence of hæmolytic streptococci.

Sir Anthony Bowlby⁹ arrives at the following conclusions on the primary suture of wounds: (1) The most important treatment is the careful cleansing of every part of the wound, and the subsequent complete excision of all dead, badly damaged, or grossly infected tissue. It is never necessary or right to remove more than a very thin edge of skin. (2) Complete asepsis is of the highest importance, and experience at the front is essential in order to select suitable cases. (3) The wound may be sutured at once, or may be left unclosed for one, two, three, or four days. It can then be sutured, with results which are identical with those obtained by immediate suture. (4) If after operation the wound is not sutured, it should be dressed in such a way that it need not be disturbed till the time for closure has come. (5) If the wound is sutured at the time of operation, the patient should be retained in hospital for not less than a week. If he cannot be retained, then the wound must not be sutured. (6) It is seldom that, even after the most careful operation, the wound is sterile, and bacteria can generally be found in the secretion on the following day. The presence of a few bacteria, whether anaerobes or the ordinary pyogenic forms, does not prevent healing. Streptococci which can hæmolyze blood constitute the most dangerous form of infection, and if they are detected the sutures should be at once removed. (7) No definite rule can be laid down as to the time after which suture should not be done, but the sooner the wound can be operated upon the

FULL'S TWO-STAGE OPERATION FOR TENDON SUTURE IN THE HAND.

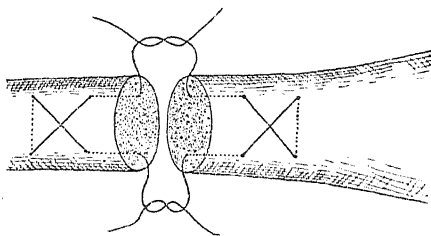


Fig. 143.—The suture in place. Knots only partly tied.

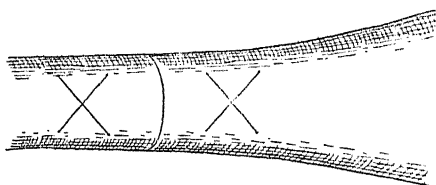


Fig. 144.—Suture tied. Knots buried between cut margins of tendon.

Redrawn from the 'Journal of the American Medical Association.'

greater is the probability of success. It can be sutured later. (8) If the wound edges are found on examination to be already indurated and inflamed, or if definite gas gangrene has already commenced, the wound must not be closed. Whenever there is any doubt at all it is best to leave the wound open, knowing that it can be equally well sutured in a day or two if this appears advisable.

Delayed Primary Suture.—That is to say, after three or four days, before the wound has granulated freely. Considerable success has attended the complete suture of wounds up to the fifth day, when in the first instance it was thought inadvisable to use primary suture. Colonel Gask¹⁰ quoted 15 cases, including 5 compound fractures, in which there was only one failure from delayed primary suture. The wounds were excised, left open, and packed with gauze soaked in flavine and covered with jacquiette. Carrel's tubes were sometimes used. Usually on the third day the wound was dressed under anæsthesia and washed with flavine and sutured.

Electrical Identification of Muscles at Operation.—Foulke¹¹ states that the faradic current is useful for the identification of muscles during operation. For instance, if the electrode is applied to the ulnar nerve behind the elbow, the flexor carpi ulnaris contracts, and can be distinguished in the presence of much scar tissue from the flexor sublimis digitorum. All that is required is a small coil with a battery and sterile electrodes.

Treatment of Unstable Scars.—See SCARS, UNSTABLE, p. 381.

For the use of Radium in the treatment of wound scars, see p. 37.

REFERENCES.—¹*Lancet*, 1918, i, 831; ²*Brit. Med. Jour.* 1918, Mar. 9; ³*Lancet*, 1918, i, 370; ⁴*Jour. Amer. Med. Assoc.* 1918, i, 1873; ⁵*Lancet*, 1918, i, 299; ⁶*Boston Med. and Surg. Jour.* 1917, ii, 808; ⁷*N. Y. Med. Jour.* 1918, i, 833; ⁸*Brit. Jour. Surg.* 1918, July, 92; ⁹*Brit. Med. Jour.* 1918, i, 333; ¹⁰*Med. Bull.* 1918, Mar., 23; ¹¹*Brit. Med. Jour.* 1918, i, 453.

YAWS. (See also SYPHILIS.)

Sir Leonard Rogers, M.D., F.R.C.P.

PATHOLOGY.—H. G. Maul¹ records an interesting study of the bone and joint lesions in yaws by means of x rays. These lesions were seen in 20 per cent of the total cases, usually as oval or elliptical rarefied areas in the long axis of the bones, but sometimes affecting the articular surfaces, and without the periosteal thickenings of syphilis. The shaft of the tibia or fibula was most often affected, namely, in 40 per cent, and the phalanges in 30 per cent, the lesions being multiple in 75 per cent. Salvarsan leads to a rapid regeneration of the bone, and Castellani's Mixture to a gradual improvement.

TREATMENT.—P. Harper² records having treated 542 cases of yaws with intravenous and intramuscular injections of Kharsivan and Arsenobillon, with cure in all but three general paralysis cases. L. E. Guerrero, E. Domingo, and M. Arguelles³ report on the treatment of yaws with Castellani's mixture (see MEDICAL ANNUAL, 1918, page 31, for formula) in the absence of the more efficient but expensive salvarsan and substitutes for it. They gave two courses of ten to fifteen days, with five to ten days' interval between them, with satisfactory results, continuing for five days after all the lesions had disappeared. Some relapses occurred, and it is too early to say if the recoveries will be permanent.

REFERENCES.—¹*Philippine Jour. Med. Sci. (B.)*, 1918, March, 63; ²*Trans. Soc. Trop. Med. and Hyg.* 1917, Feb., 82; ³*Philippine Jour. Med. Sci. (B.)*, 1918, July, 1916.

Part III.—Miscellaneous.

PUBLIC HEALTH:

INCLUDING

- I. MEDICO-LEGAL AND FORENSIC MEDICINE.
- II. STATE MEDICINE, INCLUDING LEGAL DECISIONS.
- III. INDUSTRIAL DISEASES AND TOXICOLOGY.
- IV. SCHOOL MEDICAL SERVICE.

EDITED BY JOSEPH PRIESTLEY, B.A., M.D., D.P.H.

Medical Officer of Health, Metropolitan Borough of Lambeth.

I. MEDICO-LEGAL AND FORENSIC MEDICINE.

DURATION OF PREGNANCY.

The case of *Bowden v. Bowden* in the Divorce Court showed a difference of opinion amongst the medical experts as to what may be the duration of pregnancy—307 days being allowed in the particular instance under review, thereby increasing the very small number of other recorded cases of similar prolonged gestations, viz., 298, 306, and 308 days respectively. Sexual intercourse took place on December 19, 1915, and the child was born on October 22, 1916—the wife stating that there had been no sexual intercourse between those dates, her husband being away in France. The further interesting points about the case are: (1) Menstruation took place in January, 1916; (2) Patient was operated upon for appendicitis on March 10, 1916, and found to be pregnant; and (3) Patient had a fall on September 28, 1916, for which she was treated at a nursing home. It was held by one medical expert that labour had begun at the time of the fall, viz., on September 28, 1916, but had been arrested. The Judge believed the wife's evidence, and the petition was dismissed, the Court holding that the issue in the case was only of fact, and that the legal presumption is that a child born in wedlock is legitimate unless impossibility through non-access of the husband to the wife is proved, there being no evidence, other than the date at which the child was born, pointing to adultery on the part of the wife.

DISCHARGED (SHELL-SHOCK) SOLDIER AS TRAM-DRIVER.

During an inquiry held by Colonel Pringle at Dover into a tram accident, it was found that the accident was due to the tram-driver having completely 'lost his head' at the critical moment, failing, thereby, to make use of the proper brakes at his disposal. It was found, further, that the tram-driver was an ex-soldier, having been discharged from the Army for nervous breakdown after eighteen months' service in Egypt, and that he was, consequently, unsuitable for the particular work of tram-driving, which, being on a difficult route, made it specially dangerous for any driver whose nervous system was, for any reason, below the average. The result of the inquiry should be brought to the notice of the Central Labour Employment Bureau, if such has not already been done.

II. STATE MEDICINE, INCLUDING LEGAL DECISIONS.

MATERNITY AND CHILD WELFARE.

The Local Government Board continues its valuable help to municipal and voluntary maternity and child welfare centres by "fertilizing them with Government grants," to use an expression introduced by a prominent official of the Board. The time has come for this particular branch of Public Health to be 'boomed' and to be extended and increased all over the country—at a much greater rate than is at present the case. Ante-natal clinics are as important as natal and post-natal clinics, and closely associated with them all should be dental clinics, day nurseries, and even night nurseries. Maternity homes, where women of the poorer classes can be confined for a nominal fee and away from their own crowded and sanitariously unsatisfactory houses, are also a prime necessity in all working-class and poor neighbourhoods. For all these purposes, health visitors, nurses, and midwives (all efficiently and properly trained) are needed, as well as medical men and women. In addition, a new kind of official is being introduced, called the 'home-help,' whose duty it is to take charge of the *home* of the woman during her confinement and after, whether such confinement takes place at the house or away from the house. In this way the children are looked after, meals provided for the husband and the other inmates, and the premises generally kept clean and tidy, thereby relieving the mother from much worry and anxiety. The urgent need for such officials as 'home-helps' will be acknowledged by everybody who has had any experience at all of the usual conditions that obtain in an ordinary working-class or poor-class dwelling or flat when a confinement takes place and after, during the necessary convalescence of the mother. Financial assistance is absolutely necessary for local authorities and for voluntary centres, and this help with money from the Imperial Exchequer will be considerably increased in the future owing to the greater powers conferred upon local authorities and, through them, upon voluntary centres, by the new Maternity and Child Welfare Act, 1918 (passed August 8, 1918), under which maternity and child-welfare committees can be appointed—specially appointed as such, or they may be an existing committee or a sub-committee of an existing committee. Each maternity and child-welfare committee *must include at least two women*, but two-thirds of the members must be members of the Council.

When the Act gets fully into working order, large numbers of health visitors will be wanted; indeed, the Local Government Board suggests one health visitor for every 400 births. What are to be the qualifications of such officers? At present, the qualifications prescribed by the Board's 1909 Order, with regard to London, are: a medical degree, or the full training of a nurse, or the certificate of the Central Midwives Board, or some training in nursing and the health visitor's certificate of a society approved by the Board, or the previous discharge of duties of a similar character in the service of a Local Authority. The certificate of a sanitary inspector is also valuable.

INFLUENZA AND ITS PREVENTION.

Even allowing for the Press 'booming,' there has been a widespread epidemic of influenza during 1918 over the British Isles and, indeed, over the whole world—a veritable pandemic, with enormous numbers of deaths. Where the epidemic first started is still in doubt. Some say Spain, others Russia. The latter view is strengthened by the fact that the last officially investigated influenza epidemic, 1889–90, was traced to Russia as the starting-point—a country where the disease appears to be endemic in places, becoming at times epidemic over large tracts or even over the whole of Russia, and then extending beyond that country's boundaries to other countries, thereby becoming pandemics.

The Royal College of Physicians of London deemed the 1918 epidemic of such importance as to warrant the issuing of an authoritative statement on the subject under date of November, 1918. This statement may be summarized as follows: The epidemic is virtually world-wide, irrespective of race, com-

munity, or calling. Similar world-wide epidemics occurred in 1803, 1833, 1837, 1847, 1890. The conditions of epidemic prevalence of influenza are too obscure to allow of precise prediction, but the 1918 outbreak is essentially identical, both in itself and in its complications, including pneumonia, with that of 1890; and the disproportionate occurrence of a special symptom, a well-recognized phenomenon in the case of epidemics, as for example, nose-bleeding in the 1918 epidemic, does not invalidate this statement. The present epidemic has no relation to plague as some have suggested. The virus of influenza is a living organism, but the nature of the virus is still uncertain, though it is capable of transference from man to man. The virus is possibly beyond the present range of microscopic vision. Pfeiffer's bacillus, the pneumococcus, and, above all, the streptococcus, seem to be responsible for most of the fatal complications of influenza during the 1918 epidemic. The infection is conveyed from the sick to the healthy by the secretions of the respiratory surfaces, being given off in the form of fine spray, and transmitted through the air for considerable distances during coughing, sneezing, and even loud talking. The channels of reception are normally the nose and throat. Hence the need for avoiding overcrowding and thronging of every sort, whether in places of public resort, public conveyances, factories, camps, dwelling-rooms, or dormitories. The period of incubation is about forty-eight hours or even somewhat less. The danger of influenza consists in its complications, which may develop insidiously and without previous signs of severe illness. Everything depends upon the individual affected, who must be taught to realize and acquiesce in his duty to the community. Well-ventilated rooms (without draughts) and the wearing of warm clothing out-of-doors are necessary, as also is good nourishing food (and enough of it). In this respect, war rations are fully adequate to the maintenance of good health, though they may not afford just the particular articles that each fancy demands. Alcoholic excess invites disaster; regular habits should be maintained unaltered. Gargling of the throat every four to six hours if possible, or at least *morning* and *evening*, is advised, and the gargle should consist of a suitable disinfectant mixture (e.g., 20 drops of liquor sodæ chlorinatæ in a tumbler of warm water). A solution of common table salt (a teaspoonful to the pint of warm water) is suitable for a nasal douche, to be snuffed up the nostrils from the palm of the hand two or three times a day.

No form of inoculation can be guaranteed to protect against, or to cure, the disease itself, and no vaccine should be used except under medical advice. The chief dangers of influenza lie in its complications. No drug is a preventive. Bed is indicated at the first feeling of illness or rise of temperature.

Segregation of patients is necessary, at least until the temperature is normal.

The virus of influenza infection is very easily destroyed, and extensive measures of disinfection are not, therefore, called for.

The above authoritative statement of the College of Physicians of London was adopted officially by the Local Government Board and circulated by the Board amongst all medical officers of health, in addition to the Board's other circulars. The *real* damage that the influenza has done will be shown when the statistics appear, giving the total deaths and the percentage deaths, the latter being the more important, because they will indicate to what extent the epidemic has increased the total general death-rate—an increase that may or may not prove to be as great as the layman and even some experts anticipate. Many other facts will be tabulated. Public authorities have difficulties of administration in dealing with an influenza epidemic on account of the very short incubation period of the disease and the rapidity with which it spreads from person to person. The ordinary means of prevention do not apply in the sense that they apply to a disease like small-pox or scarlet fever, viz., (a) prompt notification, (b) isolation in a hospital, (c) disinfection, and (d) medical inspection of contacts. It must rather be left to the individual to apply such measures to himself and his immediate surroundings, leaving to the public authorities the educational side and the prevention of overcrowding in public places, vehicles, schools, etc., as well as in private premises used as common lodging-houses and dormitories, etc., and the arranging for the

proper ventilation at stated intervals of all such public or quasi-public places. The Local Government Board introduced orders with a view to such ventilation being effected, known as the Public Health (Influenza) Regulations, 1918, and the Public Health (Influenza) Regulations (No. 2), 1918, under which it is provided that, where the public are admitted to a place of public entertainment (as defined in the Regulations), the entertainment shall not be carried on for more than three hours consecutively, except in the case of a cinematograph exhibition, when the period of three hours may be extended to four hours; and, further, that there shall be an interval of not less than thirty minutes between any two entertainments given at a place of public entertainment (as defined in the Regulations) to which the public are admitted—such interval to be for the purpose of the premises being effectually and thoroughly ventilated. In the case of cinematograph exhibitions, children from a district wherein a public elementary school has been temporarily closed on account of the prevalence of influenza shall not be admitted to such exhibitions in that particular district during the continuance of the closure of any such school. The Regulations came into force on November 25, 1918, to continue in force until revoked by Order of the Board, and apply to England and Wales.

School closure or exclusion, exclusion from or closure of places of public entertainment, exclusion from occupations, provision of proper nursing and medical assistance and of the more recently-introduced domestic assistance or home-help, are also matters that fall amongst the duties of public authorities in connection with the carrying out of preventive measures to be taken in dealing with influenza outbreaks, which may be so widespread as to be epidemics or even pandemics. It must not be forgotten, however, how important are the personal or individual's preventive measures. The three forms of the disease must be remembered, viz., (a) nervous, (b) catarrhal (bronchitis and pneumonia), and (c) gastric. Symptoms of cerebrospinal fever and poliomyelitis (polio-encephalitis) have undoubtedly appeared following upon influenza, or in houses wherein ordinary influenza cases have occurred, and there would appear to be every reason for believing that such symptoms represent the nervous form of influenza. It may be, also, that the so-called 'botulism' and 'solanism' outbreaks (recently reported) were forms of influenza, as, too, the London 'epidemic stupor,' of which lethargy was a prominent symptom—*acute encephalitis lethargica*, as it is called officially, compulsorily notifiable on and after January 1, 1919. (*See also INFLUENZA.*)

CEREBROSPINAL FEVER.

On April 1, 1918, the Public Health (Cerebrospinal Fever) Regulations, 1918, came into force, enabling Councils of administrative counties and of county boroughs throughout England and Wales to provide or arrange for the provision of serum for the treatment of cases or suspected cases of cerebrospinal fever, together with the necessary apparatus for the use of the serum, and to provide or arrange for the examination of suspected cases and of contacts, the expenses incurred to be defrayed in the case of a county council as expenses for general county purposes, and in the case of a county borough council as part of the expenses incurred by the council in the execution of the Public Health Acts.

ISOLATION INFECTIOUS DISEASES HOSPITALS AND THEIR USES.

Hitherto it has been accepted as an axiom of public health administration that *early* notification of *all* cases of infectious diseases, *prompt* isolation in hospital, *efficient* disinfection, and *thorough* quarantining or medical inspection of all 'contacts,' 'suspects,' and 'carriers' would, on theoretical grounds at least, stamp out any epidemic, and many administrative officers of repute and experience still hold to this view and endeavour, with apparent success, to carry such view into practice. Hence, isolation hospitals are built in all well-equipped administrative areas. Signs have not been wanting recently of a change of official views, pointing to isolation hospitals being of value more as treatment centres of serious cases than as isolation centres pure and simple.

These changed views have been given effect to, owing to war conditions apparently, by the Metropolitan Asylums Board—the infectious diseases hospitals authority for the Metropolis—in a circular letter, suggesting that mild cases of scarlet fever and ‘bacteriological diphtheria’ should be isolated at home. This is a somewhat serious experiment—at least in the opinion of the old school of health officers, and the results will be watched with anxiety as well as with interest. The question naturally arises as to whether or not isolation hospitals have lessened in the past the incidence of infectious diseases or their severity. The quarter of a century’s experience that health authorities all over the world have had ought to be able to give a definite and decisive answer to what is, after all, a simple question.

LEGAL DECISIONS.

The following legal decisions, published during 1918, are important in relation to State Medicine and Sanitary Administration.

ADULTERATION OF FOOD AND DRUGS.

Andrews v. Luckin (King’s Bench Division).

Sale of Food and Drugs Act Amendment Act, 1879, s. 3, and Sale of Food and Drugs Act, 1875, s. 6—Milk—Place of delivery.

A farmer was under contract to serve pure milk (with warranty) to a milk vendor in a neighbouring town. A consignment of milk on arrival at the town station was found to be below the standard laid down in the Milk Regulations, 1901. Between the country and town stations the churn was not secured against tampering. The magistrates refused to convict, and dismissed the summons, on the ground that the farmer was relieved from responsibility by the fact that the milk was genuine when delivered at the country station. An appeal was lodged. *Held*, that the fact that the milk was genuine at the country station did not relieve the farmer from responsibility, and the case was remitted to the Magistrates with a direction accordingly.

Appeal allowed and case remitted.

Grigg v. Smith (King’s Bench Division).

Sale of Food and Drugs Act, 1875, s. 6—Cow not fully milked—Regulations, 1901, do not apply.

The owner of one cow sold a sample of milk to an Inspector, and, on analysis such milk was found to be deficient in fat (2·6 instead of 3 per cent) as laid down in the Milk Regulations, 1901. The vendor stated that this deficiency in milk fat was due to the manner of milking the cow—the first milkings containing less fat than the last. The Magistrates held that the milk was as it came from the cow, and, accordingly, the information was dismissed. *Held*, that the Magistrates’ decision was correct, the presumption under the Milk Regulations, 1901, being rebutted on account of the milk being as it came from the cow.

Appeal dismissed.

Williams v. Rees (King’s Bench Division).

Sale of Food and Drugs Act, 1875, s. 6—Milk as from the cow—Milk not of merchantable quality being deficient in fat.

A sample of milk was sold, and proved, on analysis, to be deficient in fat to the extent of 28 per cent, although it was as it came from the cow. The Magistrate dismissed the summons, stating, however, that, though the milk came from the cow, it was “not of merchantable quality.” A case was stated for the decision of the High Court, and it was *held*, that the finding that the milk was “not of merchantable quality” did not distinguish the case from *Hunt v. Richardson* (see MEDICAL ANNUAL, 1917, pp. 575–6) and *Grigg v. Smith* (see above), and that therefore the Magistrate was right.

Appeal dismissed.

BYLAWS.

Governors of Repton School v. Repton District Council (King's Bench Division).

Public Health Act, 1907, s. 23—Building bylaws being ultra vires—Addition to front of existing building.

The Repton District Council adopted a L.G.B. bylaw requiring the provision of an open space in connection with the erection of a new domestic building. The Governors of Repton School made an addition to their school building, an addition to the front of the building, so that the bylaw could not, in practice, be carried out. The Repton District Council threatened to pull the new additional building down in consequence, and an action was brought by the Governors to restrain them from doing so. *Held*, that the bylaw was unreasonable, in that it prevented the owner of property doing what he ought to be able to do, and was, therefore, *ultra vires* and bad, and that the injunction should go. *Judgement for the plaintiffs.*

N.B.—This judgement was upheld on appeal at a later date. ²

CRIMINAL LAW.

Rex v. Howarth (Court of Criminal Appeal).

Criminal law—Question asked (after summing up) by the Jury of a witness—Prisoner not allowed to cross-examine or give rebutting evidence.

Held, that, where a witness is recalled after the summing-up and interrogated, the prisoner has a right to cross-examine such witness and to give evidence in rebuttal. *Conviction quashed.*

HOUSING AND TOWN PLANNING.

Broadbent v. Rotherham Corporation (Chancery Division).

Housing, Town Planning, etc., Act, 1909, s. 13 (3)—Demolition order—Alleged refusal by sanitary authority to carry out order of the High Court—Motion for writ of sequestration.

A further legal step has been taken in connection with the above action (see MEDICAL ANNUAL, 1918, p. 635). An injunction was granted to prevent the demolition orders being carried into effect, on the ground that the local authority had not properly exercised its discretion under section 18, subsection 3, of the Act. As the result of the granting of this injunction, the Rotherham Corporation, through a sub-committee, inspected the dwellings and considered the plans and specifications of the owner, and came to the conclusion that the dwellings were not capable of being put into proper order and condition and made fit for human habitation without demolition, which must, therefore, proceed, declining, at the same time, to comply with the plaintiff's request for information in what respect the plans and specifications did not meet the requirements. The plaintiff applied for a writ of sequestration by motion. *Held*, that the motion must be dismissed, for that, on the evidence, the defendants had heard and determined the plaintiff's application according to law. *Motion dismissed.*

NUISANCES.

Great Central Railway Co. v. Doncaster Rural District Council (Chancery Division).

Nuisance from tipping of house refuse and faecal matters—Application for injunction—Evidence given for and against—Injunction granted conditionally.

The Company applied for an injunction to restrain the Rural Sanitary Authority from tipping waste matters and faeces upon a field near one of the Company's stations. Evidence was given by experts for and against. The Rural Sanitary Authority applied to the Local Government Board and the Ministry of Munitions for permission to raise money for the purpose of building destructors, but without avail. *Held*, that injunction be granted, but, having

regard to war conditions and the refusal of the Local Government Board and the Ministry of Munitions to grant permission for a destructor scheme, such injunction be suspended until the expiration of six months after the war, subject to the deposits being promptly covered as soon as made.

Injunction granted conditionally

Frost v. King Edward VII National Memorial Tuberculosis Association
(Chancery Division).

Nuisance at common law—Tuberculosis (surgical) hospital as a danger to surrounding persons and property—Injunction granted conditionally, i.e. subject to a six months' suspension and with power to apply to the Court for a further suspension.

The King Edward VII National Memorial Hospital (surgical tuberculosis) was opened in June, 1917, in a superior residential neighbourhood on land forming part of an estate which had been developed subject to a building scheme. The ground lease contained covenants against using the premises for noisy, noisome, or offensive businesses, or permitting anything that might be hazardous or noisome or injurious to the lessor, his property, or his tenants. There was a reversion of this lease, and a further conveyance was drawn up, covenanting to observe the covenants of the original lease and also a new covenant (in a conveyance made in 1889) not to use the premises otherwise than as a private dwelling-house. An injunction was applied for on the ground that the tuberculosis (surgical) hospital was a nuisance and, also, a breach of the covenants. *Held*, that the hospital (surgical tuberculosis) was not a nuisance at common law, and that the carrying on of the hospital was not a breach of the covenants in the original lease, but was a breach of the new covenant not to use the premises otherwise than as a dwelling-house, and that, consequently, the injunction must be granted, but that such injunction be suspended for a period of six months, with power to the defendants to apply for a further extension of the suspension. *Judgement for the plaintiffs.*

Rex v. Chapman; ex parte Arlidge (King's Bench Division).

Public Health (London) Act, 1891, ss. 4 (1), 5 (1), 99 (4).—Nuisance—Serving of notice by order of a chairman of committee.

A nuisance was discovered during the time that the Public Health Committee of the Sanitary Authority was in recess, and a notice was served by order of the Chairman, to whom power had been given under a bylaw to act in urgent matters when the Sanitary Authority was in vacation, such act to be reported to the Sanitary Authority afterwards. The necessary work was not carried out by the owner, and a summons was taken out, with the result that the Magistrate convicted, making an order for the work to be done so as to abate the nuisance satisfactorily and so as to prevent its recurrence. An appeal was lodged and a rule *nisi* applied for to the Magistrate to show cause against a writ of *certiorari* to quash the order made by him. *Held*, that the Chairman of the Public Health Committee was the duly authorized agent of the Sanitary Authority, and that the notice was valid and the Magistrate's order regular.

Rule discharged.

SEWAGE FARMS.

Liverpool Corporation v. H. Coghill & Son Ltd. (Chancery Division).

Public Health Act, 1875, s. 21—Rivers Pollution Prevention Act, 1876, s. 7—Prescription Act, 1832, s. 2—Sewage farm and trade effluent (borax)—Prescriptive right—Nuisance.

The defendants carried on the trade of borax manufacturers (established 1836), discharging the waste borax liquor into the sewers and so on to the sewage farm, causing thereby, in 1908 and since up to 1917, a nuisance, and rendering a part of the farm sterile. The nuisance and injury were denied, and further it was claimed that there was a right acquired by prescription (no complaint having been received during a period of very many years). *Held*, that,

if the plaintiffs had power to confer a right as claimed, the enjoyment which had been exercised by the defendants had been secret, intermittent, and unknown to the plaintiffs, and that therefore the claim of prescription right failed: further, that the nuisance and damage to crops being proved in 1917 on the facts, the plaintiffs were entitled to an injunction against the defendants and an inquiry as to damages. *Judgement for the plaintiffs.*

UNSOOUND FOOD.

Ollett v. Jordan (King's Bench Division).

Public Health Act, 1875, s. 117—Unsound food—Exposure for purpose of sale.

A fish merchant consigned pickled herrings to a hospital for use by the inmates, the hospital being situated in a town far removed from the fish merchant's premises from which the pickled herrings—which were, at the time of consignment, in a sound condition—were sent. The herrings arrived at the hospital on the following day, and were found to be unfit for human food, and were seized and condemned under the Act. The Magistrates refused to convict. *Held*, that there was an exposure for purpose of sale at the hospital, the sale of the herrings being subject to a condition that, on arrival at the hospital within a reasonable time, they should be fit for human food.

Appeal allowed and case remitted.

WATER POLLUTION.

Maxwell-Willshire v. Bromley Rural District Council (Chancery Division).

Public Health Act, 1875, s. 17—Right of local authority to natural water-course for the purpose of draining uncontaminated water.

Held, that a natural flow of water in a defined natural channel is a natural stream or water-course within the meaning of section 17 of the Public Health Act, 1875, even though it burrows into the land in the lower part of its course, and is gradually absorbed by it. *Case dismissed.*

III. INDUSTRIAL DISEASES AND TOXICOLOGY.

HEALTH OF MUNITION WORKERS.

It would be difficult to find a more interesting book—especially a blue book—than the Final Report of the Health of Munition Workers Committee appointed by the Ministry of Munitions under the chairmanship of Sir George Newman. The Report was published during April, 1918, and consists of 20 sections, 11 appendices, and an index, dealing with the important subjects of industrial fatigue, hours of labour, and other matters affecting the personal health and physical efficiency of workers in munitions factories and workshops. The Report is most exhaustive. After a preliminary and historical survey and a few introductory remarks (ss. 1 and 2), the relation of fatigue and ill-health to industrial efficiency is dealt with (s. 3), followed by the following subjects: (a) The industrial employment of women (s. 4), calling for short hours of work with suitable shifts, pauses, and intervals, adequate and suitable medical inspection, good and sufficient food at convenient times, a suitable factory environment, the careful selection of women for work within their capacity, and sympathetic management and tactful supervision; (b) Hours of labour (s. 5); (c) Shifts, breaks, spells, pauses, and holidays (s. 6); (d) Sunday labour and night work (s. 7); (e) Lost time and incentive (s. 8); (f) Food and canteens (s. 9); (g) Sickness and ill-health (s. 10); (h) Injuries and accidents (s. 11); (i) Eye injuries (s. 12); (j) Special industrial diseases (s. 13), e.g., trinitrotoluene (T.N.T.), lead, aeroplane dope, poisonous gases, fulminate of mercury, tetryl (tetra-nitro-methyl-anilin), picric acid, nitrous fumes, and dermatitis; (k) Cleanliness, ventilation, heating, and lighting (s. 14); (l) Sanitary accommodation, washing facilities, and cloakrooms (s. 15); (m) Seats, weights, clothing, drinking water (s. 16); (n) Welfare supervision for

women and girls (s. 17); (o) Welfare supervision for boys and men (s. 18); (p) Welfare outside the factory (s. 19); (q) Summary of conclusions (s. 20). The Report is well illustrated.

The kernel of the Report is s. 20, but, in the space available in this article, an abstract only of the Committee's summary can be given, and interested readers must be referred to the Report itself, which consists of 182 pages. An abstract of the Committee's Summary may be given as follows:—

Further improvement is much needed in the environment and conditions of employment of the workers, and further care and attention are still essential if a serious breakdown of industry is to be avoided [i.e., during war time; but also, in the opinion of the Committee, the principles involved are fundamental to all schemes for industrial health and betterment *after* the war.] Without health there is no energy, and without energy no output, and the subject of industrial efficiency in relation to health and fatigue is in large degree one of preventive medicine, a question of physiology and psychology, of sociology and industrial hygiene. The intimate inter-relationship between hours of labour and working efficiency is proved by exact scientific experiments which show definitely that, by reducing substantially hours of labour, there is a subsequent and resultant increase of output, whether the workers be male or female, subject, of course, to systematic shifts, breaks, spells, pauses, and holidays. Sunday labour and night labour should be, speaking broadly, taboo, being unpopular, uneconomical, and not productive of increased output. Causes of lost time should be carefully ascertained and the various incentives to work considered. Recreation is an essential aid to recovery from fatigue. Canteens and welfare arrangements for men, women, boys, and girls are *sine qua non*, as are also cleanliness, ventilation, heating and lighting, sanitary and washing accommodation, etc., in connection with the premises that are used as factories, workshops, and workplaces. A permanent Industrial Fatigue Research Board has now been appointed.

Toluene and its Nitration: Poisonous Effects.—The first stage of nitration gives mononitrotoluene (a heavy, dark, cherry-coloured oil), which, during the second stage, changes to binitrotoluene (or trivalene), a crystalline substance looking much like brown sugar, with a faint odour of bitter almonds and a bitter, acrid taste. Both mononitrotoluene and binitrotoluene are absorbed through the skin and mucous membranes, and the latter seems to have a marked transient and, perhaps, more or less permanent effect upon the central nervous system (multiple peripheral neuritis and optic atrophy), in addition to the commoner symptoms which are generally associated with this form of industrial poisoning as the outcome of high-explosives manufactures, e.g., the well-known toxic symptoms connected with the digestive, circulatory, and nervous systems, as opposed to the well-known irritative symptoms. The nervous symptoms may be tabulated as drowsiness, depression, loss of memory, apathy, disorders of sight (blurred vision, etc.), and (in the later stages) delirium, coma, and convulsions. Multiple peripheral neuritis and optic atrophy are now noted by American observers as rarer nervous symptoms.

Further cases of T.N.T. (trinitrotoluene) poisoning are to hand during 1918—a series of 5 specially recorded cases by Drs. Gregorson and Taylor, of which 2 were fatal. The nearest approach to the jaundice due to T.N.T. poisoning is the rare and obscure jaundice of acute yellow atrophy of the liver. There is undoubted disturbance of the circulation of the bile, ending in an accumulation and absorption of the constituents in the blood, leading to severe anæmia with pronounced fall in the percentage of hæmoglobin and extreme polymorphonuclear leucopenia. Itching of the skin, which usually accompanies jaundice, was absent, and oozing from the unwounded mucous membrane was a prominent feature. The principal channels of absorption of the T.N.T. were apparently the lungs and stomach—a certain amount of dust (impregnated with the poison) being first inhaled, then becoming attached to the mucous membrane of the mouth and throat, and finally being swallowed with the saliva. Gastric disturbance and peripheral neuritis were the earliest symptoms noticed, headache, anæmia, and jaundice following in the order named.

Benzol Poisoning.—Benzol or benzene is a derivative of coal-tar distillation, being an unstable, very volatile, colourless fluid with a heavy aromatic odour. It is used extensively in many industries, and has given rise to much morbidity and to some mortality amongst workers—the poisonous substances contained in the benzol or benzene being hydrogen sulphide, toluene, and bisulphide of carbon, which appear to have a specific affinity for the central nervous system and a general action on the protoplasm of the organic cells, reducing the numbers of leucocytes in the blood. Female workers, particularly at the age of puberty and at the menstrual period, are especially susceptible. The poison enters the system through the respiratory organs (by vapour inhalation) or through the skin or the digestive tract (by absorption).

The poisoning may be: (1) *Acute*—intense mental excitement, causing the patients to act “as if they had gone crazy,” laughing, crying, gesticulating, etc., with subsequent coma and (sometimes) death; or (2) *Chronic*—headache, spongy bleeding gums, bluish-green spots over various parts of the body, severe nose-bleeding, extreme weakness and dyspnoea, vertigo and dizziness, delirium, coma, convulsions, and (may be) death.

IV. SCHOOL MEDICAL SERVICE.

MEDICAL INSPECTION AND TREATMENT.

The war has boomed maternity and child welfare schemes and work, but within the boom must also necessarily come medical inspection of school children and the treatment of defects found. It is satisfactory to be able to report that, speaking generally, during the war, children in schools are in a better-nourished and all-round condition than they were before the war—except in so far as their cleanliness (or rather the want of it) is concerned. Verminous heads and bodies, ringworm and scabies, conjunctivitis, etc., have increased owing to want of parental control and actual introduction of the *causa causans* from the dug-outs and fronts.

Strange to say, again speaking generally, school children have not suffered from the nervous effects of air-raids, nor do they appear to have suffered from want of sleep as the result of the Daylight Saving Act as was prophesied from many quarters would be the case.

The above facts are not simply the opinion of the writer of this article, but are the *ex cathedra* statements of the Chief Medical Officer of the Board of Education. At the same time, the School Medical Service machinery has been put out of gear by the war, and some little time must necessarily elapse before the machinery is properly at work again—with such reconstruction as may be necessary under the new Education Act. These requirements are fully set out in the 1917 Annual Report of the Chief Medical Officer of the Board of Education, to which school medical officers are referred, so that they may prepare their schemes. It will be noted that the new Education Act emphasizes the true object of the School Medical Service, viz., not the detection and subsequent treatment of defects found amongst school children, but the improvement of the health and physical development of the whole child population of school age—the care and development of all children of school age, based on a full and complete system of medical inspection and diagnosis. No single uniform plan for every area will be found practicable.

That the work is absolutely necessary no one will gainsay, especially in view of the Prime Minister's warning as to the impossibility of building an A 1 empire on a C 3 basis. A ‘model inspection’ with an inquiry into the physical conditions of unselected samples of town and country school children shows interesting results. Country children are rosier; healthier; and superior in general carriage; with fewer defects of vision and hearing, but many more dental defects; more prone to mouth-breathing and the dullness of expression associated with adenoids and enlarged tonsils; less anæmic; show fewer curvatures of the spine and fewer flat-feet; but more enlarged thyroid glands. Most

of these results, tabulated as the outcome of the 'model inspection,' were to be expected, but it is more satisfactory now that official expectations are proved to be official facts. The 'model inspection' was undertaken by Dr. Thomas, of the London County Council School Medical Service.

The importance of school medical work is referred to in the Milroy Lectures for 1918, as is also the fact that the Service is specially underpaid. School medical work is "one of the most exacting forms of public health service; and it demands the energies of highly-trained individuals, if it is to be well done. The remuneration of £350 per annum for this work is a mischievous form of parsimony in the allotment of public funds to one of the most important, difficult, and responsible forms of public service." So states the Milroy Lecturer.

PHYSICALLY HANDICAPPED CHILDREN.

Among the 800,000 children attending the New York City public schools there are hundreds of physically handicapped children, including those affected with active pulmonary tuberculosis, and with bone, skin, and glandular tuberculosis. There are also many pre-tuberculous, anæmic, and crippled children, and cardiac cases. These physically handicapped or subnormal children, according to the type of case, are segregated into: (1) Out-door classes; (2) Fresh-air classes; and (3) Open-window classes. The type of physical defect should be the basis for segregation, and the range of temperature should be governed by the type of physical defect. Glass wind and storm shields are recommended, as also specially constructed window ventilators for the open-window classes (group 3). Moveable adjustable chairs are recommended. Suitable personal equipment is important; it must be sanitary and sufficient in quantity and quality.

THE EDITOR'S TABLE.

Samples (not returnable) and particulars for this section should be sent to The Editor, 'Medical Annual' Offices, Stonebridge, Bristol, on or before November 15.

We are anxious to express no opinion except as a result of practical knowledge, and it is owing to this fact that a notice in the MEDICAL ANNUAL has come to be valued.

NEW PHARMACEUTICAL PRODUCTS AND DIETETIC ARTICLES.

We are always ready, when a sufficient quantity is sent to us EARLY IN THE YEAR, to arrange for these to be tested in hospital practice and reported upon; under other circumstances our knowledge is necessarily more limited; but frequently the simple information as to where a particular preparation can be obtained is all the practitioner requires.

NEW MEDICAL INSTRUMENTS AND APPLIANCES.

We give Inventors and Manufacturers the opportunity of bringing their work before our readers entirely free of cost to themselves, subject only to the following conditions:—

(1) *Each article sent for notice must have the novelty or improvement claimed for it clearly stated upon a SEPARATE sheet or sheets of paper. This should have attached to it any illustration (WHICH MUST BE SMALL) for which insertion is desired, and also bear the maker's name. The attention of firms who send a large number of articles for notice is particularly directed to the above condition, as each article has to be sorted into its proper department before it can be considered.*

(2) *Medical Inventors should merely describe the instrument or appliance, and avoid giving technique of operations.*

The Editor is not able to accept reference to circulars, catalogues, or literature as a compliance with these conditions.

PROGRESS OF PHARMACY, DIETETICS, Etc.

Acetosol Pulverettes.—This is a very pure form of acetyl salicylic acid prepared by Messrs. Oppenheimer, Son & Co. Ltd., 179, Queen Victoria Street, E.C., in the form of pulverettes. These are small capsules with an egg-shell-like covering, containing the powder in an uncompressed form. They are much more soluble than the ordinary pellet, and give more rapid results.

Acid Acetylsalicylic B.P.—The successful manufacture of this important remedy is a triumph for British pharmacy, and we must congratulate Messrs. Menley & James Ltd., of Farringdon Road, E.C., on the result of their efforts. They have also produced a very pure form of sodium salicylate, which produces a water-white solution. Because of its purity, it is less depressant and irritating than many foreign preparations.

Barley Water and Lemon.—This is a favourite prescription in most febrile cases. It can be prepared in three minutes, and a quart costs threepence if a packet of Hugon's "Pearl Barley Lemonade" is used. This is a sick-room convenience. Messrs. Hugon & Co., of Openshaw, Manchester, are the manufacturers of the "Atora" Shredded Beef Suet so favourably known to cooks, and they also produce a number of packet soups, which, because they contain some of the Beef Suet, are more nourishing than most soups of the same class.

Cofectant (Medical).—This is a refined preparation, which after careful tests has proved one of the most efficient of antiseptics. When properly diluted, it is non-poisonous, and has no corrosive or irritant effect upon the mucous membrane. It is manufactured by Messrs. Edward Cook & Co. Ltd., Bow, London, E.

Cofectant Lozenges put up by the same firm have unquestionable value as a disinfectant for the throat and mouth, and are not at all unpalatable. We regard them as quite a valuable addition to our resources.

Messrs. Cook also manufacture under the name 'Klondol' a preparation of liq. creso. saponatus. We have always regarded saponified cresol as the best of all disinfectants for surgical instruments because of its cleansing properties, and the soap adds to its efficacy and its antiseptic properties.

Colloids, Metallic ('Ascol' Brand).—Messrs. Oppenheimer, Son & Co. Ltd. have directed considerable attention to the manufacture of colloids of the metals, and have produced reliable preparations of the colloids of silver, mercury, iron, sulphur, and copper. The fact that the metals increase in *chemical activity* as their particles are subdivided has for some time been recognized. Thus the argentum colloid 1-2000 was tested in the Municipal Laboratory at Paris, and was found to have remarkable bactericidal power over the *Bacillus coli*. This is important when the colloids are used topically for the eye, or in gonorrhœa. They may also be used hypodermically, and make excellent solutions for cataphoresis. They certainly have a great future. The therapeutic value of the salts of copper is mentioned in the present volume, and we think the 'Ascol' copper colloid quite the most convenient way of using it internally or by injection.

Dormigene.—This is a British substitute for bromural, which is well known as an efficient nerve sedative and hypnotic. It is made by Allen & Hanburys Ltd., 48, Wigmore Street, W.

Electrosal.—This is a hypochlorous solution produced electrically. The great antiseptic value of this solution was described in our last issue. It has extraordinary efficiency in diphtheria, scarlet fever, rhinorrhœa, and otorrhœa; it has been found to do what no other antiseptic will do in 'carrier' cases of diphtheria, influenza, and cerebrospinal meningitis. It is of hypertonic character, with an extraordinary freedom from irritation; has a disinfectant action at least equal to that of 5 per cent phenol, and is a non-coagulant of albuminous secretions. It is prepared by Messrs. R. Sumner & Co. Ltd., 40, Hanover Street, Liverpool.

Grindeline is a mixture used with some success in the treatment of asthma. It contains liq. ext. *grindelia robusta* 15 min., pot. iod. 2 gr., trinitrin $\frac{3}{50}$ gr., tinct. *euphorbia* 20 min. It is prepared by Messrs. Oppenheimer, Son & Co. Ltd.

Iodex c. Methyl Salicylate.—This is a new combination, and is very useful to prescribe in rheumatic troubles. It is made by Messrs. Menley & James Ltd.

Lapactic.—Under this name Messrs. Oppenheimer, Son & Co. Ltd. have put up a tiny palatinoid of Sir Andrew Clark's pill for chronic constipation, etc.: aloes gr. $\frac{1}{2}$, strychnine gr. $\frac{1}{16}$, ext. bellad. gr. $\frac{1}{4}$, ipecac. gr. $\frac{1}{16}$. One to be taken thrice a day. They form a very elegant prescription.

Mullplast.—Messrs. Oppenheimer, Son & Co. Ltd. have introduced a new method of skin medication in the form of a plaster, named mullplast, which is only slightly adhesive and which contains a definite amount of the medicament in a form which readily acts upon the skin. Thus salicylic acid may be applied in this way for the removal of corns, warts, etc., and also for the treatment of ringworm. The mullplast, not being too adhesive, can be removed without pain or trouble, and is a very convenient form of application.

Pinheroin.—This formula has a good reputation for the relief of cough. It contains diacetylmorph. hydrochlor. $\frac{1}{16}$ gr., terpine hydrate 1 gr., and essent. *pinus canad.* Messrs. Oppenheimer, Son & Co. Ltd. have now put up a preparation combining it with creosote for use in phthisis.

Vaccines.—A special series of vaccines have been prepared by Messrs. Menley & James Ltd. They are standardized emulsions in normal saline of killed bacteria. They are polyvalent, and may be used with confidence both for curative and prophylactic purposes. They are supplied in boxes of 6 ampoules, representing three dilutions, for 15/-; but *staphylococcus* and "staphylococcus mixed" are only 9/-.

Vitofact.—The importance of vitamins in the nutrition of the body is becoming increasingly recognized. Those which naturally exist in food are destroyed by cooking, and this emphasizes the importance of fresh fruit and green vegetables which contain vitamins, forming an essential part of the daily food. We are very much struck by the fact that persons living on fruit and vegetables and taking no meat have the normal quantity of hæmoglobin in their blood. As we must all live largely upon cooked food, it is helpful to be able to supply vitamins as an addition to our daily food. Messrs. Oppenheimer, Son & Co. Ltd. have put up a preparation which they call 'Vitofact,' containing vitamins, and supply it in the form of pulverettes, and also in combination with cerebos salt, to be used in place of ordinary salt at meals. This is a very practical method, and we expect it will be much appreciated.

MEDICAL AND SURGICAL APPLIANCES.

Amputation Shield Retractor.—This has been designed by Mr. Valentine H. Blake.

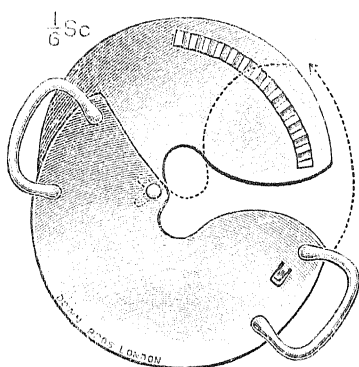


Fig. 145.

The retractor (*Fig. 145*) consists of two dished metal plates which can be taken apart at the joint, passed over the stump flaps, and locked by a ratchet into a firm circular shield, on which traction is made by a pair of handles. The advantages claimed are that it is lighter than the average shield retractor and there are no parts that offer difficulty in cleaning. It adjusts itself to the size of the bone, and can be applied with the least amount of manipulation. Down Bros. Ltd.

Analytical Apparatus.—Such appliances as acidimeter and alkalimeter, uricometer, indicanometer, sulphatometer, ammoniameter, which have been previously noticed in these pages (*vide* MEDICAL ANNUAL, 1909, p. 620), hitherto only obtainable from the Continent, have during the past few years been produced and can be supplied by Down Bros. Ltd., St. Thomas's Street, London, S.E.1., from whom all particulars can be obtained (*Figs. 146-8*).

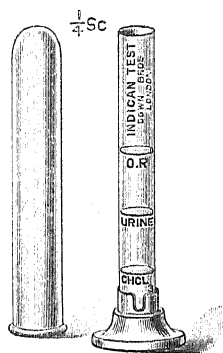


Fig. 146.—Indicanometer.

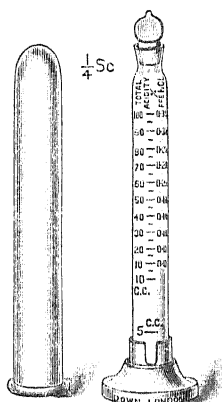


Fig. 147.—Acidimeter.

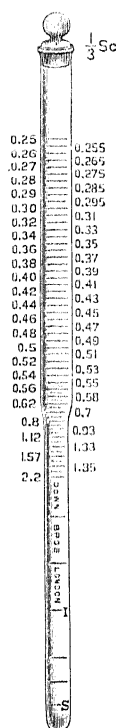


Fig. 148. Uricometer.

Appendix Clamp.—Sinclair's appendix clamp (*Fig. 149*) consists of a clamp and box for holding the appendix after removal. The clamp is claimed to facilitate the operation

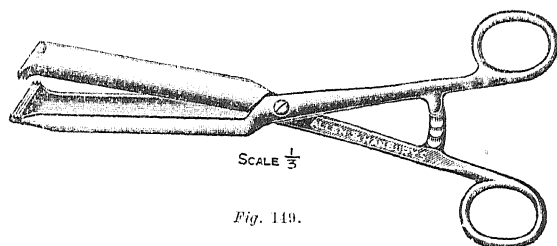


Fig. 149.

greatly, and prevents any damage to the appendix by handling. It is made by Allen & Hanburs Ltd., Wignmore Street, W.

It is made by

Arthrometer (Falconer's).—This instrument (*Fig. 150*) is designed to measure the range of mobility of joints, and enables a record to be kept during the course of treatment. Messrs. Allen & Hanburys Ltd.

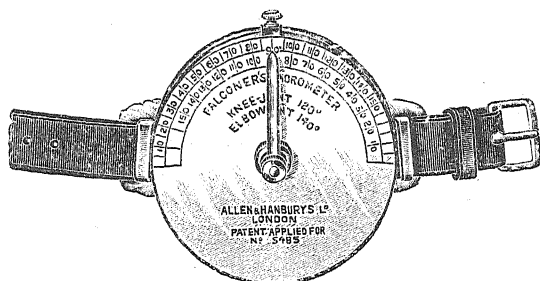


Fig. 150.

Bandage Pins.—The 'Vee' bandage pin (*Fig. 151*) is intended to take the place of the ordinary safety pin, and it is claimed that it is more rapidly applied and gives great security. Messrs. Allen & Hanburys Ltd.

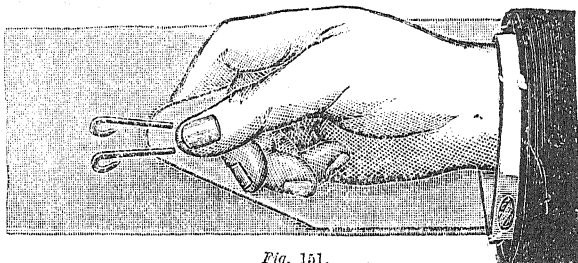


Fig. 151.

Belt for Floating Kidney.—For the treatment of displaced kidney we have found this arrangement, made by the Doman Company, very efficient. It is a belt which gives support to the whole abdominal wall, a very necessary thing in the majority of such cases, and also a special pad for exercising pressure at the point where it is most needed. The immediate relief which one of these belts gives to the patient is always a satisfaction. They are supplied by the Doman Belts Co. Ltd., 456, Strand, London, W.C. 2. (*Fig. 152.*)

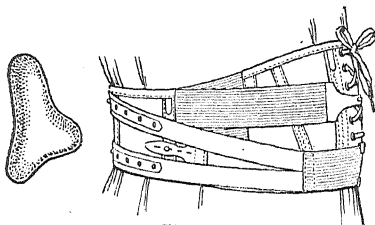


Fig. 152.

Bone Surgery (Operative Instruments for).—Mr. Fredk. H. Albee, of New York, has designed a set of instruments (*Figs. 153-159*) for cranial and osteoplastic surgery. They consist of a small universal electric motor with a foot-switch to control its speed, Doyen's circular skull saw with spare blades and guards to regulate the depth of cut, Albee's twin saw and adjustment for working the saws at a right angle to motor, a spray-fitting to prevent overheating when using the saws on hard bone, Albee's dowel cutter, calipers, gauges, etc., all the necessary instruments for repairing bone by means of the autogenous bone graft, dowel inlay, or wedge. With this equipment bone can be sawn, drilled, or fashioned into nails or any other form required under aseptic technique. By use of the twin saw (the blades of which can be set and worked at any distance apart) parallel-sided gutters can be cut of any length and depth required, and accurately fitting bone grafts shaped and let in so as to unite the fragments. In the shafts of the long bones and in the treatment of Pott's disease and other spinal lesions longitudinal grafts are fitted. In uniting the patella, H-shaped and dovetail forms have been applied. By the use of

the single saw, gutters and inlays of wedge-shaped cross-section are made, the saw being held at an angle. For fuller information reference is recommended to Albee's work on *Bone Graft Surgery* (W. B. Saunders Co.).

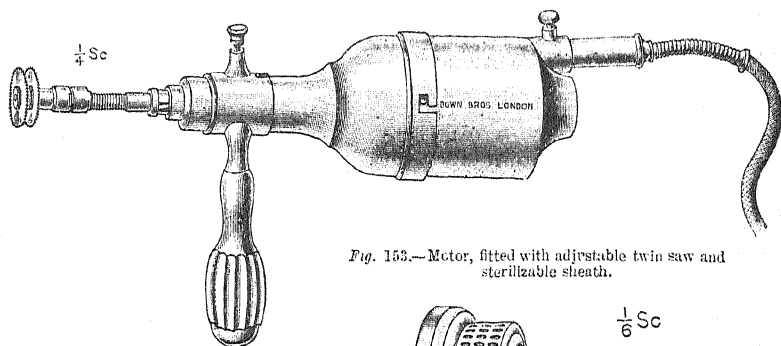


Fig. 153.—Motor, fitted with adjustable twin saw and sterilizable sheath.

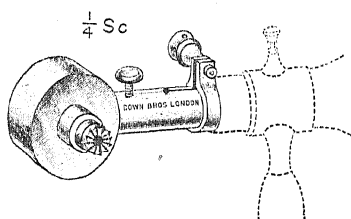


Fig. 154.—Apparatus for cutting bone dowels.

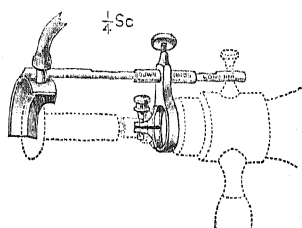


Fig. 156.—Spray-fitting to prevent overheating.

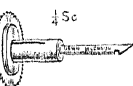


Fig. 157.—Doyen's saw.

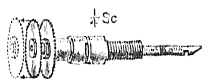


Fig. 158.—Twin saw.

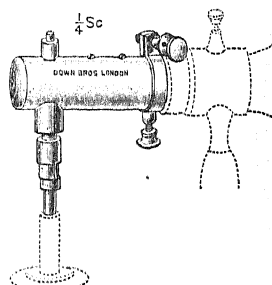


Fig. 159.—Adjustment for working saw etc., at a right angle to motor.

The instruments can be used with electric power on any current available, employing the Albee motor illustrated above, or Hey Groves's universal electric motor, which has a flexible shaft and hand-piece. They are manufactured by Down Bros. Ltd., who have supplied them to the various Government Medical Services. The makers also supply them to use with their silent hand-motor where electric power is not available.

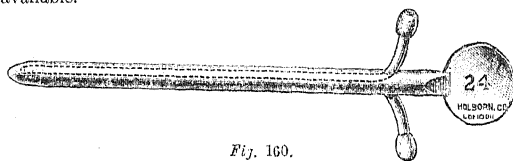


Fig. 160.

Bougies.—Harrison's hot-water bougies for dilating strictures are so constructed that hot water can be made to circulate through the bougie, the heat so obtained serving to help the process of

dilatation. The bougies were made for Col. Harrison, D.S.O., by the Holborn Surgical Instrument Co. Ltd., 26, Thavies Inn, E.C. 1. (Fig. 160).

Cystoscopes.—Under the direction of Mr. Thompson Walker, Messrs. Allen & Hanburys Ltd. are making a plain examination cystoscope and also a double catheterization cystoscope. They are also undertaking the manufacture of examination and irrigation and single catheterizing instruments. The manufacture of such instruments has been almost entirely in Continental hands, and we are glad to see the British manufacturer producing them.

Drainage Tube.—Surg.-Gen. Arthur Edmunds has designed a corrugated indiarubber sheeting to take the place of the ordinary drainage tube. It is supplied in sheets 6 by 12 inches, and can be cut to any required size. Allen & Hanburys Ltd.

Drop-foot Appliance.—This is a simple form of appliance which can be attached to any ordinary boot by means of screws. The mechanism can be easily understood from the illustration (*Fig. 161*). It was designed by Lieut. Lawson, and costs 12/6. Allen & Hanburys Ltd.



Fig. 161.

Fracture Appliances.—Major Sinclair has designed a number of instruments for the special treatment of gunshot fractures—wire twisters, wire-cutting pliers, wound directors, wire guides, and calipers. These are made by Messrs. Allen & Hanburys Ltd. *Fig. 162* illustrates the wire guide.

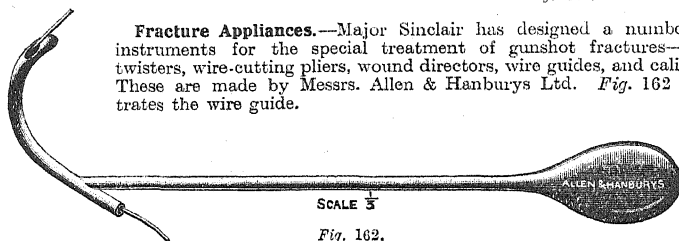


Fig. 162.

Fracture and Orthopædic Table.—This table (*Fig. 163*) has been designed to provide for the suspension and immobilization of the trunk and extremities during manipu-

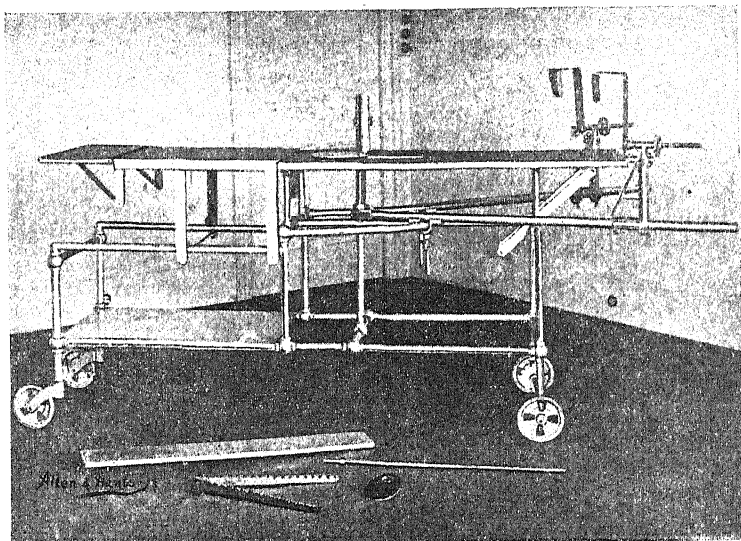


Fig. 163.

lation, without lifting or disturbing the patient. It also affords the necessary support and traction of the limbs in the treatment of fractures. It is designed by Dr. Geo. W. Hawley, and manufactured by Messrs. Allen & Hanburys Ltd.

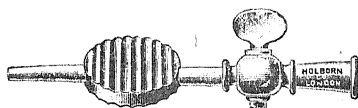


Fig. 164.

ous injections, as the needle can be placed in line with the vein, and the intervening piece of rubber tubing with connections usually employed between the nozzle of the syringe and the needle can be dispensed with. Both can be obtained from the Holborn Surgical Instrument Co. Ltd.

Iodine Pencil.—This is a glass tube, with rubber cork, wick, and airtight cap for use when painting the skin with iodine before operation. It is a convenient form of carrying and applying iodine solution, and does away with

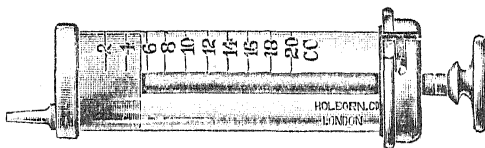


Fig. 165.

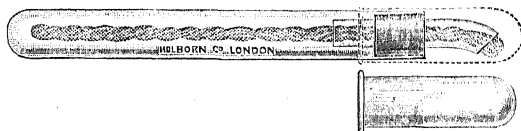


Fig. 166.

a bottle, brush, etc. Suggested by Major Charles F. White, and made by the Holborn Surgical Instrument Co. Ltd. (Fig. 166.)

Lumbar Puncture Needle.—The Holborn Surgical Instrument Co. Ltd. have made a

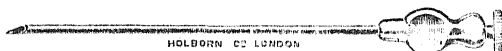


Fig. 167.

new lumbar-puncture needle in three sizes, 2, 2½, and 3 inches (Fig. 167). The mount can either be inserted in rubber tubing or plugged on to a Record syringe.

Mechanical Drill.—Fig. 168 illustrates Sir W. Arbuthnot Lane's mechanical drill. It is based upon the principle used by all mechanics for rapidly drilling a hole, but we

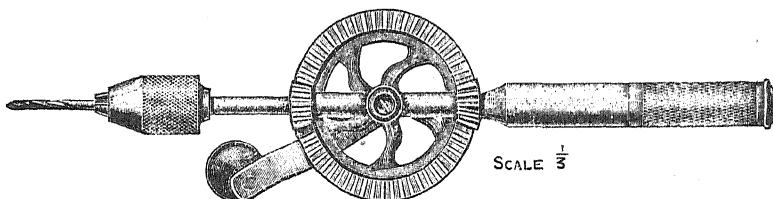


Fig. 168.

think it should be furnished with some check to the depth of the hole, without which it would be a little difficult to control. Messrs. Allen & Hanburys Ltd.

The Monochord.—An appliance for determining the upper tone limit of auditory perception is described by Mr. Mayhew Mollison (Fig. 169). It consists of a steel piano wire stretched on a steel frame, on which runs a bridge which can be adjusted to throw

various lengths of the wire into vibration. The (longitudinal) vibrations are produced by friction with resined leather or cotton-wool soaked in spirit. This instrument is said to be the one that gives the most constant results, the three factors involved being: (1) length of vibrating wire, (2) gauge, (3) material, all of which being easily standardized, the same notes are always obtainable and no complicated tuning when finished (such as is the case with whistle tests) is required, and by its means the upper tone limit can be tested not only through air, but through bone. This probably led

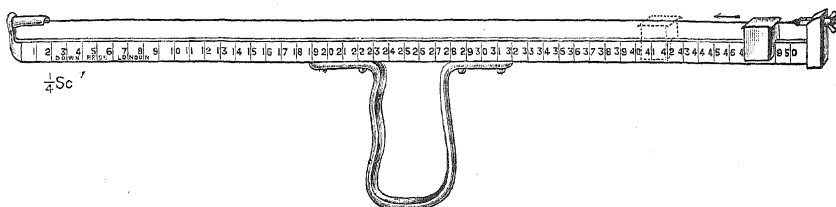


Fig. 169.

to the discovery that Rinne's test with high notes is always negative. The accuracy of the instrument is such that a difference of $\frac{1}{2}$ cm. in 20 cm. length is easily appreciated by the patient. The results are expressed in lengths of wire, audition through air being placed over that through bone (the frame of the monochord being held on the mastoid process): thus for normal individuals $\frac{\text{air}}{\text{bone}} = \frac{1\frac{1}{2}}{1\frac{1}{2}}$ as an average. The instrument is made by Down Bros. Ltd., St. Thomas's Street, London, S.E.1.

Motor Repairs.—There is a point in reference to motor repairs which is of some importance at the present time, when new parts are difficult to get or—if the motor is of an old pattern—impossible. If the part is broken, even badly, the art of scientific welding has now become so highly developed that it is easy to have the fracture reunited and the part made as good as new. Of course these results are only obtained

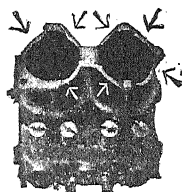


Fig. 170.—A pair of motor car cylinders with 7 lugs broken and missing.

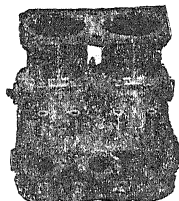


Fig. 171.—The same cylinders after recreation by Barimar scientific welding experts.

by firms who make scientific welding a speciality, as every metal requires a different process to secure complete fusion. The Barimar Co. Ltd., 10, Poland Street, London, W.1, have done excellent work during the war in restoring motors, and our readers will perhaps be glad to know where to go if in trouble over these matters. (Figs. 170, 171.)

Nasal Douche.—This is a neat vessel for giving nasal douches, the flow of the liquid being regulated by the finger. It is made of toughened glass, so that it can be sterilized by boiling without fear of breakage. Messrs. C. J. Hewlett & Sons Ltd., 35-42, Charlotte Street, E.C. 2.

Plaster Frame (Abbot's).—This apparatus consists of a rigid, adjustable, tubular steel frame, which has been designed specially to facilitate the application of extension, correcting spinal curvature, and the moulding of plaster-of-Paris splints and jackets. It is made by Messrs. Allen & Hanburys Ltd., 48, Wignmore Street, W. 1.

Remedial Exercise Machine.—Miss Slocombe, of the Totnes Red-Cross Hospital, has designed this apparatus to assist patients in recovering from physical infirmities by enabling them to perform physical exercise of the affected muscles. It appears to us to be well designed for this purpose, and our readers who are interested should ask Messrs. Allen & Hanburys Ltd. to send them a pamphlet which fully illustrates the appliance and the method of use.

Salvarsan Apparatus.—We illustrate in *Fig. 172* an apparatus devised by Surgeon A. M. Henry, R.N., to facilitate the administration of salvarsan, etc., to a large number of patients in succession. The advantages sought are portability and rapidity in action.

A large burette for the medicament and a smaller one for normal saline solution are mounted on a metal plate, with their lower ends connected with a three-way cock, so that either fluid may be given as required. In the top of the larger burette is fitted a cork pierced by a bent glass tube, connected through a two-way cock and a long piece of rubber tubing with an ordinary hot-water bottle, which, being enclosed in a pair of hinged boards, forms a foot-bellows. Six short detachable "units," consisting of a special needle mounted on to a 5-inch rubber tube, are supplied with each apparatus.

Since the preparation of the illustration, the inventor has somewhat simplified the apparatus, and now proposes to use a large hand-bellows in place of the foot-bellows, and further has adopted a simpler type of needle.

The apparatus is made by Down Bros. Ltd., St. Thomas's Street, London, S.E.1.

The appliance illustrated in *Fig. 173* is designed by Dr. Rodrigue, and used at the Italian Hospital. It is very similar to the London Hospital pattern, the slight pressure necessary being obtained by means of a double bellows instead of gravitation.

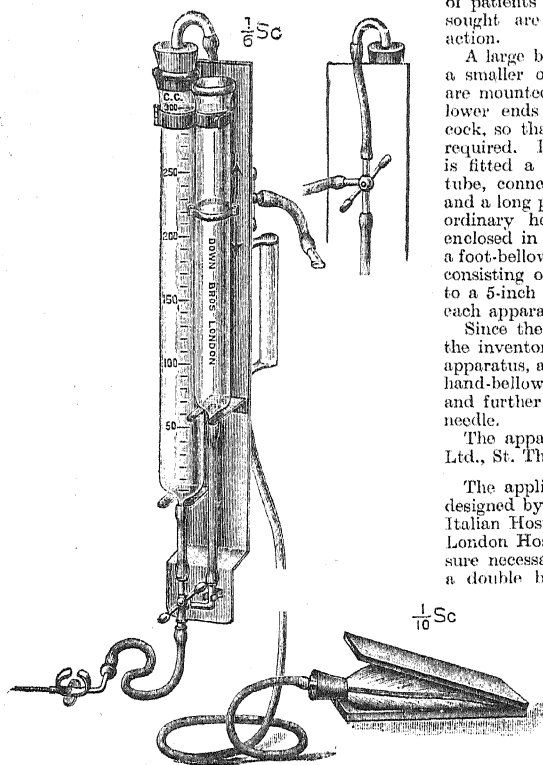


Fig. 172.

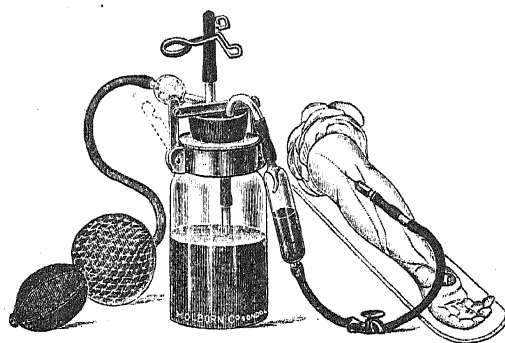


Fig. 173.

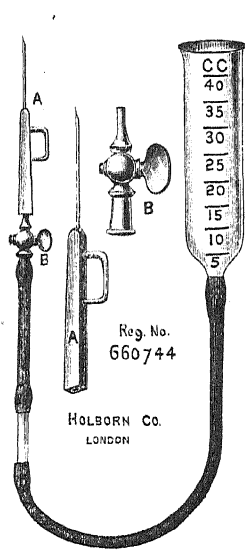


Fig. 174.

The apparatus shown has a special clamp for keeping the rubber cork in position, and also a drop-tube to show the rapidity of the flow. The glass bulb shown at the back

is filled with sterile wood and acts as a filter. The Holborn Surgical Instrument Co. Ltd. are the makers.

The same firm have constructed a portable '606' outfit, at the suggestion of Col. Harrison, which is most convenient when the apparatus has to be conveyed in a hand-bag. Full particulars can be obtained from the makers.

We illustrate another very compact apparatus, designed by Dr. H. W. Abbott. (*Fig. 174*.) The whole can be packed in the small sterilizer provided for the purpose, and put into the bag, ready for use. This is also made by the Holborn Surgical Instrument Co. Ltd.

Stoneware Still.—This new invention of the Holborn Surgical Instrument Co. Ltd. (*Fig. 175*) is used in many Government hospitals. It works automatically: the steam is condensed on a stoneware dome and collected in a stoneware dish, from which it runs into a sterile flask without coming in contact with any metal. The risk of toxin poisoning encountered in copper stills is thus avoided. The water produced has been analyzed by Government experts, and the still is approved and recommended.

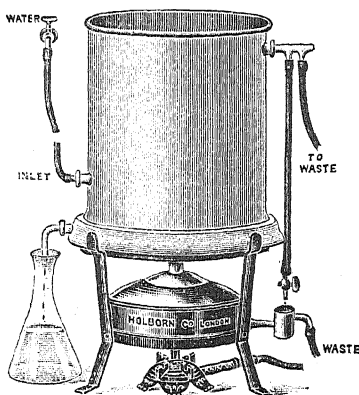


Fig. 175.

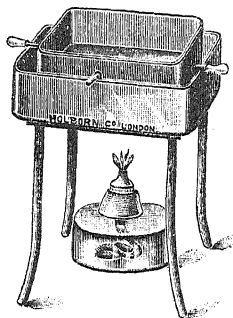


Fig. 176.

Sterilizers.—We illustrate in *Fig. 176* a syringe and needle sterilizer designed by Dr. Robert J. Mills, of Norwich. The legs are made to unscrew for portability, and the upper tray has insulated handles. It is made by the Holborn Surgical Instrument Co. Ltd.

Formalin Sterilizers for Catheters are made by Messrs. Allen & Hanburys Ltd. The

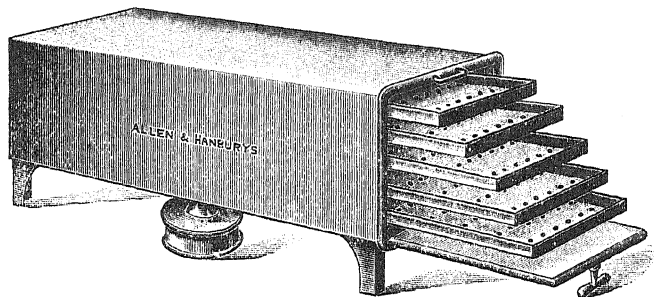


Fig. 177.

one shown in *Fig. 177* is intended for hospitals. A smaller one with three trays meets the requirements of the private practitioner.

Tourniquet.—Page's anchor pattern tourniquet (*Fig. 178*) is made with a handle which greatly facilitates application and removal. Messrs. Allen & Hanburys Ltd.

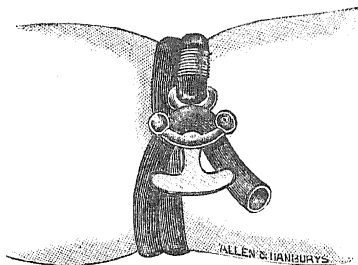


Fig. 178.

Throat Lamp.—*Fig. 179* illustrates Aynard's throat lamp, with nickel-plated metal arm and rubber-covered flex cords. The whole lamp may be sterilized by boiling. Allen & Hanburys Ltd.

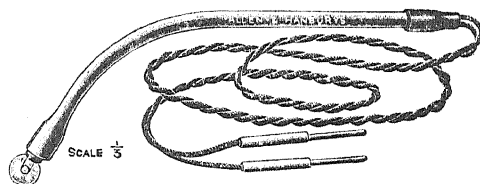


Fig. 179.

Urethral Irrigator.—This is the form (*Fig. 180*) used by Dr. Wyndham Powell, and is made entirely of metal except for the rubber cork. The nozzles plug on, and a

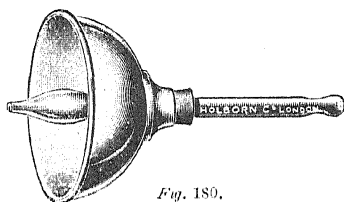


Fig. 180.

number of them can be kept ready, and a fresh one used for each patient. It has a distinct advantage over the former all-glass pattern, which was liable to break. The Holborn Surgical Instrument Co. Ltd. are the makers.

Urethral Nozzle.—The illustration (*Fig. 181*) shows a glass backflow urethral irrigating nozzle designed by Dr. A. C. Magian, who claims it as the most convenient form

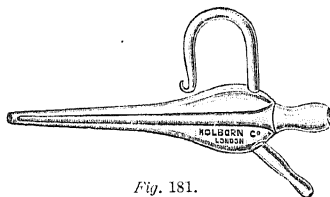


Fig. 181.

of nozzle in existence, as the handle on the top saves the operator's fingers from becoming stained, and the nozzle is of a shape to plug the meatus efficiently. It is made by the Holborn Surgical Instrument Co. Ltd.

Urethroscope.—Dr. Wyndham Powell's urethroscope has been improved (*Fig. 182*), and will be found to meet every requirement. Messrs. Allen & Hanburys Ltd.

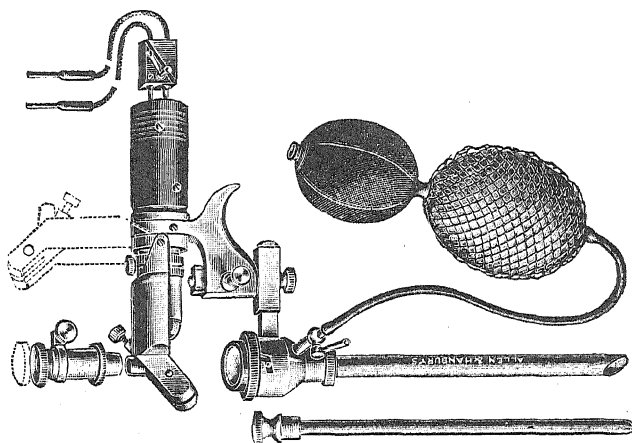


Fig. 182.

Urological Table and Chair.—This special arrangement has been made for the venereal diseases department of the London Hospital by Messrs. Allen & Hanburys Ltd., Wigmore Street, W. (*Fig. 183.*)

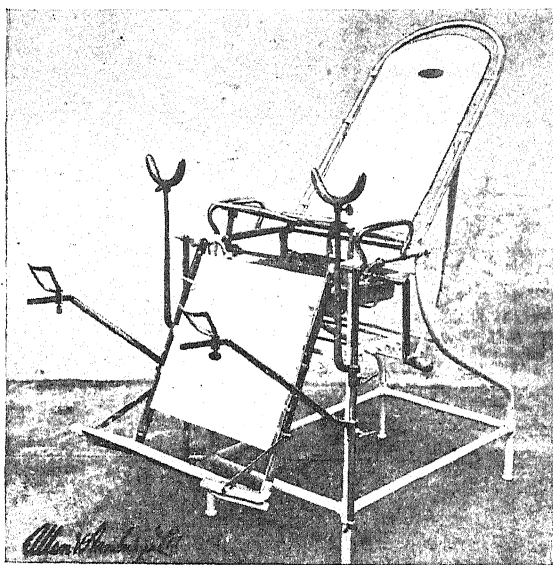


Fig. 183

BOOKS OF THE YEAR.

A LIST OF THE PRINCIPAL MEDICAL WORKS AND NEW EDITIONS PUBLISHED DURING 1918.

** * For the convenience of our readers any of the works in this list can be obtained from
Messrs. John Wright and Sons, Ltd., 'Medical Annual' Offices, Bristol.*

AMBULANCE AND NURSING.

- FIRST AID IN EMERGENCIES. By Eldridge L. Eliason. 2nd edn., enlarged. 18mo. *Lippincott* - Net 6s.
HOME NURSING. Arranged according to the revised Syllabus of the St. John Ambulance Association. By Mildred Heather Bigg. 18mo, pp. 272. *Office* - Net 1s. 6d.
SOLDIER'S FIRST AID. A Simple Treatise on How to Treat a Sick or Wounded Comrade. By R. C. Wood. 18mo, pp. 93. *Macmillan* - Net 1s. 6d.
WAR NURSING. What every Woman should Know. Red Cross Lectures. By Charles Richet. Translated by H. de Vere Beauclerk. 12mo, pp. 119. *Heinemann* - Net 3s. 6d.

ANATOMY AND PHYSIOLOGY.

- ANATOMY. Descriptive and Applied. By Henry Gray. 20th ed. Edited by Robert Howden. Notes on Applied Anatomy revised by A. J. Jex-Blake. Roy. 8vo, pp. 1340. *Longmans* - Net 37s. 6d.
CUNNINGHAM'S MANUAL OF PRACTICAL ANATOMY. Revised and edited by Arthur Robinson. 6th ed., revised. 3rd impression. Vol. I. Cr. 8vo, pp. 703. Vol. II, pp. 666. *H. Frowde*. - Each Vol. Net 12s. 6d.
HANDBOOK OF PHYSIOLOGY. By W. D. Halliburton. 14th ed. 8vo, pp. 956. *J. Murray* - Net 16s.
INTRODUCTION TO THE PHYSIOLOGY AND PSYCHOLOGY OF SEX. By S. Herbert. 2nd ed., 8vo, pp. 148. *Black* - Net 5s.
MANUAL OF PHYSIOLOGY. By G. N. Stewart. 8th ed. 8vo, pp. 1269. *Baillière*. - Net 21s.
PRINCIPLES OF GENERAL PHYSIOLOGY. By William Maddock Bayliss. 2nd ed., revised. Roy. 8vo, pp. 882. *Longmans*. - Net 24s.
SURGICAL APPLIED ANATOMY. By Sir Frederick Treves, Bart. 7th ed., revised by Arthur Keith and Colin Mackenzie. 18mo, pp. 702. *Cassell* - Net 10s. 6d.

BACTERIOLOGY.

- APPLIED BACTERIOLOGY. Studies and Reviews of some Present-day Problems. Edited by C. H. Browning. Cr. 8vo, pp. 307. *Frowde* - Net 7s. 6d.
MANUAL OF BACTERIOLOGY. By R. Tanner Hewlett. Clinical and Applied. 6th ed. Deny 8vo, pp. 779. 31 Plates, 69 Illus. *Churchill* - Net 14s.

CANCER.

- CAUSE, PREVENTION AND TREATMENT OF CANCER AND OTHER DISEASES. By W. H. Hildebrand. 12mo, pp. 169. *W. H. Smith* - Net 2s. 6d.
INFLUENCE OF SUNLIGHT IN PRODUCTION OF CANCER OF THE SKIN. By Norman Paul. 4to. *H. K. Lewis* - Net 10s. 6d.

CHEMISTRY AND PHYSICS.

- PHYSICAL CHEMISTRY OF THE PROTEINS. By T. Brailsford Robertson. Deny 8vo, pp. 500. *Longmans* - Net 25s.
REAGENTS AND REACTIONS. By Edgardo Tognoli. Translated from the Italian by C. Ainsworth Mitchell. 18mo. *Churchill* - Net 6s.

CHILDREN'S DISEASES.

- BABY WELFARE. By W. E. Robinson. A Guide to its Acquisition and Maintenance. By W. E. Robinson. 8vo, pp. 220. *T. F. Unwin* *Net 7s. 6d.*
 NATURAL FEEDING OF INFANTS. By F. Truby King. With an Introduction by J. S. Fairbairn. Cr. 8vo, pp. 33. *Whitcomb & Tombs* *Sewed, Net 1s.*

DENTISTRY.

- MODERN DENTAL MATERIA MEDICA, PHARMACOLOGY, AND THERAPEUTICS. By J. P. Buckley. 4th ed., revised. 8vo. *Heinemann* *Net 15s.*

EAR, NOSE, AND THROAT.

- ADENOIDS AND TONSILS. By Algernon Coolidge. Cr. 8vo. *Oxford University Press.* *Net 2s. 6d.*
 ENQUIRY INTO THE ANALYTICAL MECHANISM OF THE INTERNAL EAR. By Sir Thomas Wrightson. With an Appendix by Arthur Keith. 8vo, pp. 265. *Macmillan.* *Net 12s. 6d.*
 EQUILIBRIUM AND VERTIGO. By Isaac H. Jones. With an analysis of pathological cases by Lewis Fisher. Illus. Roy. 8vo, pp. 459. *Lippincott* *Net 21s.*
 WAR OTITIS AND WAR DEAFNESS. By H. Bourgeois and M. Sourdille. Preface by Mécim-Inspecteur Toubert. English Translation Edited by J. Dundas Grant. *Military Medical Manuals.* Cr. 8vo, pp. 249. *U.L.P.* *Net 6s.*
 THROAT, NOSE AND EAR. By Lamb. 4th ed. 384 pp. 61 Illus. *Baillière* *Net 8s. 6d.*

ELECTRICITY, RADIO-THERAPY, AND PHYSICAL METHODS.

- GYMNASTIC TREATMENT FOR JOINT AND MUSCLE DISABILITIES. By H. E. Deane. With Preface by A. Carless and F. W. Mott. Cr. 8vo, pp. 146. *Frowde* *Net 3s.*
 LESSONS ON MASSAGE. By Margaret D. Palmer. Including Swedish Remedial Gymnastics, and Bandaging. 5th ed. 8vo, pp. 350. *Baillière* *Net 10s.*
 MASSAGE AND MEDICAL GYMNASTICS. By Emil A. G. Kleen. Trans. by Mina L. Dobbie. With a Foreword by Reginald Cheyne Elmslie. 182 Illus. Roy. 8vo, pp. 632. *J. & A. Churchill* *Net 21s.*
 MEDICAL ELECTRICITY. By H. Lewis Jones. A Practical Handbook for Students and Practitioners. Revised and Edited by Lullum Wood Bathurst. Illustrated. 8vo, pp. 603. *H. K. Lewis* *Net 15s.*
 RADIOGRAPHY AND RADIO-THERAPEUTICS. Part II—RADIO-THERAPEUTICS. By Robert Knox. *The Edinburgh Medical Series.* Roy. 8vo, pp. 221. *Black* *Net 15s.*
 STUDIES IN ELECTRO-PATHOLOGY. By A. White Robertson. 8vo, pp. 304. *Routledge,* *Net 12s. 6d.*
 TEXT-BOOK OF RADIOLOGY (X-RAYS). By Edward Reginald Morton. 2nd ed., revised and enlarged. 8vo. *H. Kimpton* *Net 10s. 6d.*
 UNITED STATES ARMY X-RAY MANUAL. Authorized by the Surgeon-General of the Army. Prepared under the Direction of the Division of Roentgenology. With 219 illus. Large Post 8vo. *H. K. Lewis* *Net 18s.*
 X-RAY ATLAS OF THE SKULL. By A. A. Russell-Green. 4to. *Longmans* *Net 10s. 6d.*

EYE.

- DISEASES OF THE EYE. By J. Herbert Parsons. 3rd ed. 8vo, pp. 675. 18 Plates. 319 illus. *Churchill* *Net 16s.*
 FRACTURES OF THE ORBIT AND INJURIES TO THE EYE IN WAR. By Felix Legrange. Translated by Herbert Child. Edited by J. Herbert Parsons. *Military Medical Manuals.* Cr. 8vo, pp. 267. *U.L.P.* *Net 6s.*
 GLAUCOMA. By Robert Henry Elliot. A Text-book for the Student of Ophthalmology. 8vo, pp. 562. *H. K. Lewis* *Net 21s.*
 MEDICAL OPHTHALMOLOGY. By A. Knapp. *International System of Ophthalmic Practice Series.* Edited by W. L. Pyle. Roy. 8vo. *Heinemann* *Net 21s.*

FEVERS AND SPECIFIC INFECTIONS.

- ANTI-MALARIA WORK IN MACEDONIA AMONG BRITISH TROOPS. By W. G. Willoughby and Louis Cassidy. Cr. 8vo, pp. 69. *H. K. Lewis* *Net 3s. 6d.*
 DYSENTERY, ASIATIC CHOLERA, AND EXANTHEMATIC TYPHUS. By H. Vincent and L. Muratet. with Introduction by Andrew Balfour. Edited by George C. Low. *Military Medical Manuals.* Cr. 8vo, pp. 231. *U.L.P.* *Net 6s.*

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Burgess Hill (Sussex).—*St. George's Retreat.* Licensee, Miss Mary Slattery. Med. Supt., Dr. F. W. Apthorp. Wivelsfield, 1 mile; Burgess Hill station, 2 miles.

Burnley-in-Wharfedale (Yorks.).—*West Riding Asylum.* Scalebor Park. Res. Med. Supt., Dr. J. R. Gilmour. Burnley-in-Wharfedale station, Mid. & N.E., $\frac{1}{2}$ mile.

Buxton.—*Wye House.* Res. Med. Supt., W. W. Horton, M.D. Buxton, L. & N. W.R. and M.R., 10 minutes. See also p. 638

Caerleon (Mon.).—*Newport Borough Asylum.* Res. Med. Supt., W. F. Nelis, M.D. Caerleon, $\frac{1}{2}$ mile.

Cambridge.—*Cambridgeshire, Isle of Ely and Boro' of Cambridge Mental Hospital.* Res. Med. Supt., Dr. M. A. Archdale. Cambridge station, 3 miles.

Canterbury.—*Stone House, St. Martin's.* Res. Med. Supt., Dr. E. F. Sall. Canterbury East.

Cardiff.—*Cardiff City Mental Hospital, Whitechurch.* Res. Med. Supt., E. Goodall, M.D. Llandaff, T.V.R., 1 mile. (Temporarily in use as a War Hospital.)

Carlisle.—*Cumberland & Westmoreland Counties Asylum.* Res. Med. Supt., W. F. Farquharson, M.D. Carlisle, 3 miles.

Carlow.—*District Asylum.* Res. Med. Supt., Dr. T. A. Greene. Carlow, $\frac{1}{2}$ mile.

Carmarthen.—*Joint Counties Asylum.* Res. Med. Supt., J. Richards, F.R.C.S.E. Carmarthen, 2 miles.

Castlebar (Co. Mayo).—*District Asylum.* Res. Med. Supt., F. C. Ellison, M.D. Castlebar, 1 mile.

Chartham (near Canterbury).—*Kent County Asylum.* Res. Med. Supt., G. C. Fitzgerald, M.D. Chartham, 1 mile.

Cheadle.—*Cheadle Royal Mental Hospital.* Res. Med. Supt., W. Scowercroft, L.R.C.P., M.R.C.S. Heald Green, 1 mile.

Chester.—*Cheshire County Asylum.* Res. Med. Supt., G. Hamilton Grills, M.D. Chester station, $\frac{1}{2}$ miles.

Chichester.—*West Sussex County Asylum, Graylingwell.* Res. Med. Supt., Dr. H. A. Kidd. Chichester station, $1\frac{1}{2}$ miles. (Temporarily in use as a War Hospital.)

Church Stretton.—*Stretton House, Shropshire (for gentlemen).* Med. Supt., Dr. A. A. Watson. Res. Med. Off., Dr. J. W. W. Adamson. Church Stretton station, $\frac{1}{2}$ mile. See also p. 633

The Grove House, All Stretton, Shropshire (for ladies). Res. Prop. and Med. Supt., Dr. J. McClintock.

Clonmel.—*District Asylum.* Res. Med. Supt., Dr. Bagenal C. Harvey. Clonmel, 1 mile.

Cork.—*District Asylum.* Res. Med. Supt., Dr. J. J. FitzGerald. Cork, 2 miles.

Cupar (Fifeshire).—*Fife and Kinross District Asylum.* Res. Med. Supt., James H. Skeen, M.B. Springfield station, N.B.R., $\frac{1}{2}$ mile.

Darlington (Durham).—*Middleton Hall, Middleton St. George.* Res. Med. Supt., L. Harris-Liston, M.D. Dinsdale station, 1 mile.

Dartford.—*City of London Mental Hospital, near Dartford.* Res. Med. Supt., Dr. R. H. Stoen. Dartford, S.E.R., $1\frac{1}{2}$ miles. See also p. 637

Denbigh (N. Wales).—*North Wales Counties Asylum.* Med. Supt., Frank G. Jones, M.D. Denbigh, 1 mile.

Derby.—*Borough Mental Hospital, Rowditch.* Res. Med. Supt., Dr. S. H. Macphail. G.N.R. station, 1 mile; M.R., 2 miles. Private patients received.

See also p. 638

The County Asylum, Mickleover. Res. Med. Supt., M. L. Rowan, M.D. Derby, M.R., 5 miles; Mickleover, G.N.R., 2 miles.

Devizes.—*Wilts County Asylum.* Res. Med. Supt., S. J. Cole, M.D. Devizes, 1 mile.

Dorchester.—*The County Asylum.* In connection therewith: "*Herrison House*," the large private block in the grounds. Res. Med. Supt., G. E. Peachell, M.D. Dorchester, 3 miles. See also p. 644

Downpatrick.—*District Asylum.* Res. Med. Supt., M. J. Nolan, L.R.C.P.I. and L.M. Downpatrick, 1 mile.

Dublin.—*Bloomfield, Morehampton Rd.* Med. Off., H. T. Bewley, M.D. Dublin, 1 mile.

Elm Lawn, Dundrum, Co. Dublin (ladies). Prop., Miss Bernard.

Farnham House and Margville, Finglas, Dublin. Res. Med. Supt., H. P. D'Arcy Benson, M.D. Cab from Dublin, 2 miles.

See also p. 642

Heartfield Retreat, Drumecondra. Prop., P. Ging, Esq. Dublin, 2 miles.

Highfield (for ladies), Drumecondra; Hampstead (for gentlemen), Glasnevin. Res. Med. Supts., Hy. M. Eustace, B.A., M.D., and Wm. N. Eustace, L.R.C.P.I. & S.I. By rail, Dublin. See also p. 643

House of St. John of God, Stillorgan, Dublin. Res. Phys., Dr. P. O'Connell. Stillorgan station, $\frac{1}{2}$ mile.

Richmond District Asylum, Dublin. Res. Med. Supt., Dr. J. O'Connor Donelan.

St. Patrick's Hospital, James Street, Dublin. Res. Med. Supt., Dr. R. R. Leeper. Branch Asylum, *St. Edmundsbury*, at Lucan.

St. Vincent's Asylum, Fairview, Dublin. Vis. Med. Supt., John Murphy, F.R.C.P.I. Apply to the Superioress.

Stewart Institution, Palmerston, Chapelizod, Co. Dublin. Res. Med. Supt., F. E. Rainsford, M.D. Kingsbridge station, 2½ miles.

Verville, Clontarf, near Dublin. Prop., Dr. P. D. Sullivan.

Woodbine Lodge, Rathfarnham, 6 miles (ladies). Prop., Mrs. Bishop. Med. Supt., Dr. A. Croly. Rathfarnham tram, 2 miles.

Dudley (Stafford).—*Ashwood House*, Kingswinford. Props., Drs. Peacock and Pietersen. Res. Med. Supt., Dr. J. F. G. Pietersen. Stourbridge Junc., 3½ miles; Dudley station, 4 miles; Wolverhampton, 7 miles. Tel.: 19 Kingswinford.

See also p. 640

Dumfries.—*Crichton Royal Institution*. Res. Med. Supt., Dr. C. C. Easterbrook. Dumfries, 1 mile.

Dundee.—*Baldovan Institution* (for the treatment and education of the feeble-minded). Med. Supt., W. B. Drummond, F.R.C.P.E. Dundee, 4½ miles.

Royal Asylum, Dundee, and *District Asylum*, Westgreen, Dundee. Res. Med. Supt., W. Tuach-Mackenzie, M.D. Dundee, 3 miles; Liff, 1½ miles.

Durham.—*County Asylum*, Winterton. Res. Med. Supt., Dr. H. G. Cribb. Sedgfield station, 2½ miles, by bus.

Edinburgh.—*Edinburgh District Asylum*, Bangour Village, West Lothian. Res. Med. Supt., J. Keay, M.D. Bangour (Private) N.B.Rly.

Midlothian and Peebles District Asylum. Res. Med. Supt., James H. C. Orr, M.D. Rosslynlee station, 1 mile.

Royal Edinburgh Asylum, Morningside. Res. Phys. Supt., Dr. G. M. Robertson. Edinburgh, 1½ miles.

New Saughton Hall, Polton. Med. Supt., J. Batty Tuke, M.D., F.R.C.P. Edin. Polton station, 5 minutes; Loanhead, 10 minutes' walk. See also p. 634

Elgin.—*District Asylum*. Res. Supt., Alexander Hendry. Vis. Med. Off., Dr. D. G. Campbell. Elgin, 1½ miles.

Enfield.—*Elm Lodge*, Clay Hill. Res. Licensees, Dr. F. and Mrs. Watson. Enfield station, 1½ miles.

Ennis.—*District Asylum*. Res. Med. Supt., Dr. F. O'Mara. Ennis station, 2 miles.

Enniscorthy (Co. Wexford).—*District Lunatic Asylum*. Res. Med. Supt., Thos. Drapes, M.B. Enniscorthy, 1 mile.

Epsom (Surrey).—*The Silver Birches*, Church Street (for ladies). Res. Licensee, Miss Daniel. Co-Licensee, Dr. E. C. Daniel. L. & S.W.R. and L.B. & S.C.R., 5 minutes. Tel.: 346 P.O. Epsom.

See also p. 644

Exeter.—*City Asylum*, Heavitree. Res. Med. Supt., G. N. Bartlett, M.B., B.S. Exeter, 3 miles.

Court Hall, Kenton, near Exeter. Res. Licensees, Miss Mules, M.D., B.S., and Miss A. S. Mules. Starcross, 1 mile.

Devon County Asylum, Exminster. Res. Med. Supt., Dr. Arthur N. Davis. Exminster, 1½ miles; Exeter, 4 miles.

Wonford House (Hospital for the Insane). Res. Med. Supt., W. B. Morton, M.D. Exeter station (Queen St.) 1½ miles; (St. David's), 2 miles.

Fairford (Gloucestershire).—*Fairford Retreat*. Res. Med. Supt., A. Dewar, M.D. Fairford, 1 mile.

Glasgow.—*District Asylum*, Woodilee. Res. Med. Supt., H. Carre, L.R.C.P. & S. Lenzie station, 1 mile; Glasgow, 8 miles.

Glasgow District Hospital for Mental Diseases, Gartloch. Res. Med. Supt., W. A. Parker, M.B. Garnkirk station, 1 mile.

Govan District Asylum, Hawkhead. Res. Med. Supt., Dr. J. H. MacDonald. Crookston station.

Kirklands Asylum, Bothwell. Res. Med. Supt., Wm. M. Buchanan, M.B. Bothwell and Fallside stations, ½ mile; Glasgow, 9 miles.

Lanark District Asylum, Hartwood, Lanarkshire. Med. Supt., Dr. N. T. Kerr. Hartwood station, ¼ mile.

Royal Asylum, Gartnavel. Res. Phys. Supt., Landel R. Oswald, M.B.

Smithston Asylum, Greenock. Vis. Med. Off., Dr. James Laurie. Greenock West, 1½ miles.

Gloucester.—*Barnwood House*. Res. Med. Supt., Arthur Townsend, M.D. Gloucester, 2 miles. See also p. 641

Gloucester County Asylums, Wotton and Barnwood, Gloucester. Res. Med. Supt., Dr. J. Marnan. Gloucester station, 1 mile.

Guernsey.—*St. Peter Port Asylum*. Med. Off., E. K. Corbin, M.R.C.S.

Haddington, N.B.—*East Lothian District Asylum*. Supt., Miss Jean Sinclair. Med. Off., H. H. Robarts, M.D. Haddington station, 10 minutes.

Hatton (near Warwick).—*County Asylum*. Res. Med. Supt., A. Miller, M.B. Hatton, G.W.R. station, 2 miles; Warwick, 3 miles.

Haywards Heath.—*Brighton County Borough Asylum*. Res. Med. Supt., C. Planck, M.A., M.R.C.S. Haywards Heath, 1½ miles.

Hellingly.—*East Sussex County Asylum*, nr. Eastbourne. Res. Med. Supt., F. R. P. Taylor, M.D., B.S. Hellingly, 1 mile.

Henley-in-Arden (Warwickshire).—*Glen-dosill and Hurst Houses* (for both sexes). Res. Prop., Dr. S. H. Agar. Henley-in-Arden, G.W.R., $\frac{3}{4}$ mile.

Hereford.—*County and City Asylum* Med. Supt., T. C. Graves, M.B., F.R.C.S.E. Barrs Court, G.W., Mid., and L. & N.W.R., Hereford, 3 miles.

Hitchin (Herts), near.—*Three Counties Asylum*. Res. Med. Supt., L. O. Fuller, M.R.C.S. Three Counties station, 1 mile.

Huddersfield (near).—*West Riding Asylum, "Storches Hall,"* Kirkburton. Res. Med. Supt., T. S. Adair, M.D. Kirkburton, L. & N.W.R., 1 mile.

Hull.—*City Asylum*. Res. Med. Supt., J. Merson, M.D. Willerby station, 1 mile; Hull, 6 miles.

Inverness.—*District Asylum*. Res. Med. Supt., T. C. Mackenzie, M.D. Inverness, 2 $\frac{1}{2}$ miles.

Ipswich.—*Borough Mental Hospital*. Res. Med. Supt., Dr. W. M. Ogilvie. Ipswich, 2 miles.

Isle of Man.—*Lunatic Asylum*, Union Mills, Douglas. Res. Med. Supt., Arthur Finegan, L.R.C.P. & S., I.

Isle of Wight.—*The County Asylum*, Whitecroft. Res. Med. Supt., W. J. A. Erskine, M.D. Blackwater, $\frac{3}{4}$ mile; or Newport, 2 $\frac{1}{2}$ miles. See also p. 616

Isleworth (Middlesex).—*Wyke House*. Res. Prop., Dr. F. Murchison. Isleworth, Brentford, and Osterley station, 1 mile.

Ivybridge.—*Plymouth Mental Hospital*. Res. Med. Supt., Dr. Wm. Starkey. Bittaford, $\frac{1}{2}$ mile; Wrangaton, G.W.R., 1 $\frac{1}{2}$ miles; Ivybridge, 3 miles.

Jersey.—*Cranbourne Hall*, Grouville. Med. Supt., A. C. Stamborg, M.D. Grouville, 2 minutes' walk.

Jersey Asylum. Res. Med. Supt., Julius Labey, M.R.C.S. Gorey Village, 1 mile.

Kilkenny.—*District Asylum*. Res. Med. Supt., Louis Buggy, L.R.C.P. Kilkenny station, $\frac{1}{4}$ mile.

Killarney.—*District Asylum*. Res. Med. Supt., E. W. Griffin, M.D. Killarney, $\frac{1}{2}$ mile.

Knowle (near Fareham).—*County Asylum*. Med. Supt., H. K. Abbott, M.D. Knowle platform, $\frac{1}{2}$ mile.

Lancashire (near Newton-le-Willows).—*Haydock Lodge*, Private Mental Hospital. Res. Med. Prop., Dr. C. T. Street. Newton-le-Willows, 2 miles. See also p. 629

Lancaster.—*County Asylum*. Res. Med. Supt., D. M. Cassidy, M.D. Also "The Retreat," for private patients. Lancaster, L. & N.W. and Midland stations, each 1 $\frac{1}{4}$ miles. See also p. 617

Larbert (Stirlingshire).—*The Royal Scottish National Institution* (for education of imbecile children). Res. Med. Supt. Dr. R. D. Clarkson. Larbert station, 1 ml.

Leeds (near Menston).—*West Riding Asylum*. Res. Med. Supt., S. Edgerley, M.D. Guiseley, 1 mile.

Leek (Stafford).—*County Mental Hospital*, Cheddleton. Med. Supt., W. F. Menzies, M.D. Wall Grange station, 1 ml.

Leicester.—*Mental Hospital*, Humberstone. Res. Med. Supt., J. F. Dixon, M.D. Humberstone, $\frac{1}{2}$ mile.

Leicestershire and Rutland Asylum. Res. Med. Supt., R. C. Stewart, M.R.C.S. Narborough, $\frac{3}{4}$ mile; Leicester, 6 miles.

Letterkenny.—*Donegal District Asylum*. Res. Med. Supt., E. E. Moore, M.D. Letterkenny and Lough Swilly Rly., 1 ml.

Lichfield.—*County Mental Hospital*, Burntwood, near Lichfield. Res. Med. Supt., J. B. Spence, M.D. Lichfield City, 3 $\frac{1}{2}$ miles; Hammerwich, 1 $\frac{1}{2}$ miles.

Limerick.—*District Asylum*. Res. Med. Supt., Dr. P. J. Irwin. Limerick station, $\frac{1}{2}$ mile.

Lincoln.—*County Asylum*, Braacebridge. Res. Med. Supt., Dr. T. L. Johnston. 2 $\frac{1}{2}$ miles from Lincoln G.N.R. station.

The Lawn, Lincoln. Res. Med. Supt., Arthur P. Russell, M.B. Lincoln station, 1 mile. See also p. 643

Liverpool.—*Shaftesbury House*, Formby, near Liverpool and Southport. Res. Med. Supt., E. S. Hayes Gill, M.B. Formby station, $\frac{1}{4}$ mile distant.

See also p. 632
Tue Brook Villa, Liverpool, E. Res. Med. Supts., Drs. Tisdall and Ingull. Tue Brook station or Green Lane car.

See also p. 644

London.—*Bethlem Royal Hospital*, Lambeth Road, London, S.E. Phys. Supt., J. G. Porter Phillips, M.D., M.R.C.P.

See also p. 630
Bethnall House, Cambridge Road, N.E. Res. Med. Supt., J. K. Will, M.D. Cambridge Heath station.

Brooke House, Clapton, N.E. Res. Med. Supt., Dr. Gerald Johnston. Clapton, G.E.R.

Camberwell House, Peckham Road, S.E., 5. Res. Med. Supt., F. H. Edwards, M.D., M.R.C.P. Asst. Med. Offs., H. J. Norman, M.B., B.Ch., D.P.H., R. L. S. Nuthall, M.R.C.S. Tel.: "Psycholia, London." Telephone: New Cross, 1057.

See also p. 639

Chiswick House, Chiswick. Res. Lic., C. M. Tukey, M.R.C.S. Chiswick station, $\frac{1}{2}$ mile; Turnham Green station, 1 mile.

Clarence Lodge, Clapham Park, S.W. Prop., Mrs. F. Thwaites. Med. Off., Dr. Percy Smith. Clapham Road, and Clapham Common (Electric), 15 minutes. Tel. No. 494 Brixton. See also p. 635

Featherstone Hall, Southall (for ladies). Res. Med. Lic., W. H. Bailey, M.D. Southall station, 5 minutes.

Fenstanton, Christchurch Road, Streatham Hill. Res. Med. Supt., J. H. Earls, M.D. Tulse Hill, or Streatham Hill, 5 minutes.

Flower House, Catford, S.E. Res. Med. Supt., Dr. C. C. Bullmore. C. & D.R., Beckenham Hill, 5 minutes.

Halliford House, Sunbury-on-Thames, S.W. Res. Med. Supt., W. J. H. Haslett, M.R.C.S. Sunbury station, $1\frac{1}{4}$ miles.

Hayes Park (for ladies), Hayes, Middlesex. Res. Med. Off., Dr. H. F. Stilwell. Hayes, 2 miles.

Hendon Grove Asylum (for ladies), Hendon. Med. Lic., H. L. de Caux, L.M.S.S.A., L.S.A. (Lond.). By M.R., Hendon station, $\frac{1}{2}$ mile. See also p. 636

London County Asylum, Banstead Downs, near Sutton, Surrey. Res. Med. Supt., Dr. P. C. Spark. Belmont station, $\frac{1}{2}$ mile; Sutton station, $1\frac{1}{2}$ miles.

London County Asylum, Cane Hill, Coulsdon, Surrey. Acting Res. Med. Supt., Dr. E. S. Littelljohn. Coulsdon, S.E.R., or Coulsdon and Smitham Downs, L.B. & S.C.R., 10 minutes.

London County Asylum, Claybury, Woodford Bridge, Essex. Acting Med. Supt., G. Foster Barham, M.D. Woodford Bridge station, G.E.R., $1\frac{1}{2}$ miles.

London County Asylum, Colney Hatch, N. Res. Med. Supt., S. J. Gilfillan, M.A., M.B. New Southgate, G.N.R.

London County Asylum, Hanwell. Act. Med. Supt., A. W. Daniel, M.D.

London County Asylum, Horton, Epsom. Res. Med. Supt., Dr. J. R. Lord. L. & S.W. Ry., $1\frac{1}{2}$ miles, L.B. & S.C.R., $1\frac{1}{2}$ miles. (Temporarily in use as a War Hospital.)

London County Asylum, The Manor, Epsom. Res. Med. Supt., W. Ireland Donaldson, M.D. L. & S.W. and L.B. & S.C.R.

London County Colony (for Insane Epileptics), Epsom. Res. Med. Supt., Dr. M. A. Collins. L. & S.W. & L.B. & S.C.R. stations, $1\frac{1}{2}$ miles.

London County Mental Hospital, Bexley, Kent. Res. Med. Supt., T. E. K. Stansfield, M.B. Bexley station, $1\frac{1}{2}$ miles.

London County Mental Hospital, Long Grove, Epsom. Res. Med. Supt., D. Ogilvy, M.D. L. & S.W.R. and L.B. & S.C.R.

Moorcroft House, Hillingdon, Uxbridge, 2 miles. Med. Licensees, Mr. J. F. Stilwell and Dr. R. J. Stilwell. West Drayton station, 2 miles.

Newlands House, Tooting Bec Common, S.W. 17. Prop. and Res. Phys., Dr. J. Noel Sergeant. Streatham Hill station, 1 mile. Motor bus No. 49. See also p. 612

Northumberland House, Green Lanes, N. Res. Med. Supt., Bernard Hart, M.D. Finsbury Park station, 1 mile.

See also p. 639
Otto House, 47, North End Road, West Kensington (for ladies). Lic. Prop., Mrs. Sutherland. Lady Supt., Miss Brodie. West Kensington station, 1 mile; Barons Court station (Piccadilly Tube), 1 mile.

See also p. 641
Peckham House, 112, Peckham Road, S.E. Props., A. H. & H. G. Stocker. Res. Med. Supt., Dr. F. R. King. Peckham Rye station, 10 minutes' walk.

See also p. 617
Springfield Mental Hospital, Tooting, S.W. Med. Supt., R. Worth, M.B., B.S. Wandsworth Common station, 1 mile.

St. Luke's Hospital, Old Street, E.C. (Offices, 19, Nottingham Place, W.)

See also p. 000
The Priory, Roehampton, S.W., near Richmond Park. Res. Med. Supt., James Chambers, M.D. Barnes station, 10 minutes.

West Ham Boro' Asylum, Goodmayes, Ilford. Res. Med. Supt., Dr. John Custance Shaw. Goodmayes, $\frac{1}{2}$ mile.

Wood End House, Hayes (ladies). Med. Lic., Dr. R. J. Stilwell. Hayes station, 1 mile; Uxbridge, 3 miles.

Londonderry.—*District Asylum*. Res. Med. Supt., Dr. Hetherington. Londonderry, 1 mile.

Macclesfield.—*Cheshire County Asylum*, Parkside, and "Uplands" for private patients. Res. Med. Supt., H. Dove Cormac, M.B., M.S. Macclesfield, 1 mile.

See also p. 616
Maidstone.—*Kent County Asylum*. Res. Med. Supt., H. Wolseley Lewis, M.D. Maidstone, $1\frac{1}{2}$ miles.

West Malling Place, Kent. Res. Med. Supt., Dr. G. H. Adam. Malling station, 1 mile.

See also p. 642
Market Lavington (Wilts.).—*Fiddington House*. Res. Med. Supt., J. R. Benson, F.R.C.E. Lavington, G.W.R., 1 mile; Devizes, 6 miles.

See also p. 643
Maryborough (Queen's County).—*District Asylum*. Res. Med. Supt., Dr. P. Coffey. Maryborough, $\frac{1}{2}$ mile.

Melrose, N.B.—*Rowburgh, Berwick, and Selkirk District Asylum*. Res. Med. Supt., Patrick Steele, M.D. Melrose, 1 mile.

Melton.—*St. Audry's Hospital for Mental Diseases*, near Woodbridge. Res. Med. Supt., J. R. Whitwell, M.B. Melton station, $1\frac{1}{2}$ miles; Woodbridge station, $2\frac{1}{2}$ miles.

Merstham (Surrey).—*Surrey County Asylum*, Netherne. Med. Supt., Dr. P. C. Coombes. Coulsdon station, 2 miles.

Middlesbro'.—*Mental Hospital*. Res. Med. Supt., Dr. J. W. Geddes. Middlesbro', 2 miles.

Monaghan (Ireland).—*District Asylum*. Res. Med. Supt., Dr. T. P. Conlon. Monaghan, $\frac{1}{2}$ mile.

Montrose, N.B.—*Montrose Royal Lunatic Asylum*. Res. Med. Supt., C. J. Shaw, M.D. Hillside, $\frac{1}{2}$ mile; Dubton, 1 mile.

Morpeth.—*Northumberland County Asylum*. Res. Med. Supt., Thos. W. McDowall, M.D. Morpeth station, 1 mile.

Mullingar.—*District Asylum*. Res. Med. Supt., Dr. Laurence Gavin. Mullingar station, 1 mile.

Newcastle-on-Tyne.—*City Asylum*, Gosforth. Act. Med. Supt., H. D. MacPhail, M.D. Newcastle, 4 miles. (*Temporarily in use as a War Hospital.*)

Northampton.—*Berrywood Asylum*. Res. Med. Supt., W. Harding, M.D. Castle station, $2\frac{1}{2}$ miles; Midland station, 3 miles.

St. Andrew's Hospital, Northampton. Med. Supt., D. F. Rambaut, M.A., M.D. (T.C. Dub.). Northampton station, 1 mile.

See also p. 631

Norwich.—*Bethel Hospital for Mental Diseases*. Res. Med. Supt., S. J. Fielding, M.B. Cons. Phys., Saml. J. Barton, M.D. Norwich (Thorpe) station, 1 mile.

See also p. 634

Heigham Hall, Norwich. Res. Med. Prop., J. G. Gordon-Munn, M.D. Thorpe station, $1\frac{1}{2}$ miles.

Norfolk County Asylum, Thorpe, Norwich. Res. Med. Supt., D. G. Thomson, M.D. Whitlingham, 1 mile; Norwich, $2\frac{1}{2}$ miles. (*Temporarily in use as a War Hospital.*)

Norwich City Asylum, Hellesdon, near Norwich. Res. Phys. and Supt., Dr. David Rice. Hellesdon, 1 mile.

The Grove, Old Catton, near Norwich (for ladies). Res. Med. Supt., C. A. P. Osborne, F.R.C.S. Apply to the Misses McIntock.

Nottingham.—*City Asylum*, Mapperley Hill. Med. Supt., E. Powell, M.R.C.S.

Notts County Asylum, Nottingham. Res. Med. Supt., S. L. Jones, M.R.C.S. Radcliffe-on-Trent, 2 miles.

The Coppice. Res. Med. Supt., David Hunter, M.B. (Camb.). Midland station, $2\frac{1}{2}$ miles; Gt. Northern & Gt. Central station, $1\frac{1}{2}$ miles.

See also p. 630

Omagh.—*District Asylum*. Res. Med. Supt., Dr. John Patriek. Omagh station, 2 miles.

Oxford.—*County Asylum*, Littlemore. Res. Med. Supt., T. S. Good, M.R.C.S. Littlemore station.

The Warneford, Oxford, $1\frac{1}{2}$ miles. Res. Med. Supt., Alex. W. Neill, M.D. Oxford station, $2\frac{1}{2}$ miles.

See also p. 635

Paisley.—*Craw Road Asylum*. Res. Med. Off., Miss M. J. Gilmore-Cox, M.B., Paisley, 1 mile.

Paisley District Asylum, Riccartbar. Med. Off., D. Fraser, M.D. Paisley West, $\frac{1}{2}$ mile.

Renfrew District Asylum, Dykebar, Paisley. Res. Med. Supt., R. D. Hotchkiss, M.D. Paisley, $2\frac{1}{2}$ miles.

Perth.—*District Asylum*, Murthly. Res. Med. Supt., Lewis C. Bruce, M.D. (*Temporarily in use as a War Hospital.*)

James Murray's Royal Asylum, Perth (for patients of the middle and upper classes). Phys. Supt., D. Maxwell Ross, M.B., Ch.B. (Ed). Perth station, under 2 miles.

See also p. 640

Plympton.—*Plympton House*, Plympton, South Devon. Res. Props., Dr. Alfred Turner and Dr. J. C. Nixon. Plympton, 1 mile; Marsh Mills, 2 miles; Plymouth, 5 miles.

See also p. 641

Portsmouth.—*Borough Mental Hospital*. Res. Med. Supt., H. Devine, M.D. (Lond.). Clerk and Steward, John C. Kersey. Fratton, $1\frac{1}{2}$ miles.

Prestwich (near Manchester).—*County Asylum*. Res. Med. Supt., Dr. F. Perceval. Prestwich, $\frac{3}{4}$ mile.

Rainhill (nr. Liverpool).—*County Asylum*. Res. Med. Supt., T. P. Cowen, M.D. St. Helens, $2\frac{1}{2}$ miles; Rainhill, 1 mile.

Rotherham (Yorkshire).—*The Grange*, 5 miles from Sheffield (for ladies). Con. Phys., W. C. Clapham, M.D. Res. Phys., G. E. Mould, M.R.C.S., L.R.C.P. Grange Lane station, G.C.R., $\frac{1}{2}$ mile.

See also p. 635

St. Albans.—*Herts County Asylum*, Hill End. Med. Supt., A. N. Boycott, M.D. Hill End station, G.N.R., 2 minutes.

Napsbury Mental Hospital (under the Middlesex County Council), near St. Albans, Herts. Res. Med. Supt., L. W. Rolleston, M.B., B.S. Napsbury, M.R., 5 minutes' walk. (*Temporarily in use as a War Hospital.*)

St. Leonards-on-Sea.—*Ashbrook Hall*, Hollington (for ladies). Res. Lies., Mr. and Mrs. Charles Somerset. Warrior Square station, 2 miles.

Salisbury.—*Fisherton House Asylum*. Res. Med. Supt., Dr. R. T. Finch. Salisbury station, L. & S.W. and G.W., 5 min.

Laverstock House, Salisbury. Res. Med. Supt., Dr. E. C. Plummer. Salisbury, $1\frac{1}{2}$ miles.

Sevenoaks (Kent).—*Riverhead House* (for ladies). Res. Med. Supt., Dr. Hugh Munro. Sevenoaks station, S.E.R., $\frac{3}{4}$ mile.

Shrewsbury.—*Shropshire County Asylum*. Res. Med. Supt., W. S. Hughes, M.B., B.S. Shrewsbury station, $2\frac{1}{2}$ miles.

Sleaford.—*Kesteven County Asylum*. Med. Supt., J. A. Ewan, M.A., M.D. Raucedby, G.N.R., $\frac{1}{4}$ mile.

Sligo.—*District Asylum*. Res. Med. Supt., Dr. Joseph Petit. Sligo station, $1\frac{1}{2}$ miles.

Stafford.—*County Mental Hospital*. Res. Med. Supt., Dr. J.W. S. Christie. Stafford, 1 mile.

Coton Hill Mental Hospital, Stafford. Res. Med. Supt., R. W. Hewson, L.R.C.S. & P. (Edin.). Stafford, 1 mile.

Stirling.—*District Asylum*. Larbert. Med. Supt., Dr. R. B. Campbell. Larbert, $1\frac{1}{2}$ miles.

Stone (near Aylesbury).—*Bucks County Asylum*. Res. Med. Supt., H. Kerr, M.D. Aylesbury station, $3\frac{1}{2}$ miles.

Talgarth.—*Brecon and Radnor Asylum*. Res. Med. Supt., R. Pugh, M.D.

Tamworth (Staffs.).—*The Moat House* (for ladies). Res. Licensees, Edward Hollins, M.A., and Mrs. S. A. Michaux. Tamworth station, $\frac{3}{4}$ mile.

Taunton.—*Somerset & Bath Asylum*, Cotford, near Taunton. Res. Med. Supt., Dr. H. T. S. Aveline. Norton Fitzwarren station, 2 miles.

Ticehurst (Sussex).—*Ticehurst House*. Res. Med. Supt., C. F. F. McDowall, M.D. Wadhurst, 4 miles, or Ticehurst Rd., 3 m.

Tonbridge.—*Redlands*. Res. Med. Supt., W. A. Harmer, L.S.A. Tonbridge junc., $2\frac{1}{2}$ miles.

Virginia Water.—*Holloway Sanatorium*, Hospital for the Insane, St. Ann's Heath. Res. Med. Supt., W. D. Moore, M.D. Asst. Med. Offs., T. E. Harper, L.R.C.P., G. W. Smith, M.B., Emma M. Johnstone, L.R.C.P. & S., and C. Rutherford, M.B. Virginia Water station, 5 minutes. Seaside Branch, *St. Ann's*, Canford Cliffs, Bournemouth. Med. Off., C. E. C. Williams, M.D. See also p. 638

Wadsley (near Sheffield).—*South Yorkshire Asylum*. Res. Med. Supt., W. J. N. Vincent, M.D. Wadsley Bridge, 1 mile; Sheffield, 4 miles. (Temporarily in use as a War Hospital.)

Wakefield.—*West Riding Asylum*. Res. Med. Supt., J. Shaw Bolton, M.D. Kirk-gate and Westgate station, 1 mile.

Wallingford (Berks.).—*Berkshire Asylum*. Res. Med. Supt., Edwin L. Dunn, M.B. Cholsey, 1 mile.

Warringham (Surrey).—*Croydon Mental Hospital*. Res. Med. Supt., E. S. Pasmore, M.D. Upper Warringham, $3\frac{1}{2}$ miles.

Warrington (Lancs.).—*Lancashire County Asylum*, Winwick. Warrington, $2\frac{1}{2}$ miles. (Temporarily in use as *The Lord Derby War Hospital*, Warrington. Lieut.-Col. A. Simpson, R.A.M.C., Administrator.)

Waterford.—*District Asylum*. Res. Med. Supt., Dr. Alexis FitzGerald. G.S. & W.R., North station, 2 miles.

St. Patrick's Private Asylum, Belmont Park. Conducted by the Brothers of Charity. Med. Supt., W. R. Morris, M.B. Waterford station, 1 mile.

Wells.—*Somerset and Bath Asylum*, Wells, Som. Res. Med. Supt., Dr. G. Stevens Pope. Wells station, $1\frac{1}{2}$ miles.

Whitchurch (Salop.).—*St. Mary's House* (ladies only). Res. Med. Supt., C. H. Gwynn, M.D. Whitchurch, 1 mile.

See also p. 643

Whitefield (near Manchester).—*Overdale*. Res. Phys., P. G. Mould, M.R.C.S. Prestwich and Whitefield station, $1\frac{1}{2}$ miles.

Whittingham (near Preston).—*County Asylum*. Res. Med. Supt., Dr. J. F. Gemmel. Whittingham station, 3 mins.

Winchelsea (Sussex).—*Periteau*, near Hastings (for ladies). Physician, Harvey Baird, M.D. Winchelsea station, 1 mile.

Woking.—*Surrey County Asylum*, Brookwood. Res. Med. Supt., J. A. Lowry, M.D. Brookwood station, $1\frac{1}{2}$ mls.

Worcester.—*County & City Lunatic Asylum*, Powick. Res. Med. Supt., Dr. G. M. P. Braine-Hartnell. Worcester station, 4 miles.

York.—*The Pleasance* (ladies only). Phys. Supt. and Res. Licensee, L. D. H. Baugh, M.B. York, $1\frac{1}{2}$ miles.

See also p. 637

The Retreat, York. Res. Med. Supt., Bedford Pierce, M.D., F.R.C.P. (Lond.). York station, $1\frac{1}{2}$ miles. Also *Throzenby Hall*, a branch house, near Scarborough.

See also p. 639

Bootham Park Registered Hospital, York. Res. Med. Supt., G. R. Jeffrey, M.D. York station, 1 mile. See also p. 643

North Riding of Yorkshire Asylum, Clifton. Res. Med. Supt., A. I. Eades. York, 2 miles.

York City Asylum, Fulford, York. Res. Med. Supt., Dr. C. L. Hopkins. Naburn, $\frac{1}{2}$ mile.

MENTAL DEFICIENCY ACT, 1913: CERTIFIED INSTITUTIONS AND HOUSES.

Class A.—Certified Institutions. *Class B.*—Institutions approved under Section 37.

Class C.—Certified Houses. *Class D.*—Approved Homes.

BUCKINGHAMSHIRE.

Winslow Union Workhouse, Winslow.—20 male, 20 female, adults. Feeble minded and imbecile. Managers, Winslow Board of Guardians. (*Class B.*)

CHESHIRE.

Sandlebridge, near Alderley Edge.—290 males and females. Life care is provided, but only educable mentally defective children under 13 years of age are eligible for admission. Managers, Incorporated Lancashire and Cheshire Society for the Permanent Care of the Feeble Minded. Sec., J. S. Walker, 54, Kenwood Road, Stretford, Manchester. (*Class A.*)

Hoole Home, 57, Hoole Lane, Chester.—(Temporarily closed; now used as a War Hospital.)

CORNWALL.

The Elizabeth-Barelay Home, Bodmin.—26 females. Matron, Miss E. Hunt; Hon. Sec., Miss E. M. S. Shaw. (*Class D.*)

CUMBERLAND.

Durran Hill House, Carlisle.—65 females. Feeble minded. Higher Grade. Supt., Sister E. Ring. (*Class A.*)

DERBYSHIRE.

Hopewell Hall, Ockbrook.—50 males. Managers, The Nottingham and Notts Association for the Permanent Care of the Feeble Minded. (*Class A.*)

Whittington Hall, Whittington, near Chesterfield.—400 females. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*)

DEVON.

Western Counties Institution, Starcross.—380 males and females (trainable children). Managers, The Committee. (*Class A.*)

DORSET.

Kingsgate and Frithstow, West Moors, Wimborne.—12 females. Supt., Miss A. H. Egan. (*Class D.*)

DURHAM.

Monkton Hall Home for Lads, Jarrow-on-Tyne.—48 males. Sec., J. Stewart, 90, Pilgrim Street, Newcastle. (*Class A.*)

ESSEX.

Etloe House, Church Road, Leyton.—122 females. Feeble minded, over 16. Managers, The Sisters of the Sacred Hearts

of Jesus and Mary, Church Road, Leyton. (*Class A.*)

Poor Law Institution, Tendring, Weeley.—26 males, 26 females. Managers, Guardians of the Tendring Union. H. J. Burden, Superintendent. (*Class A.*)

Royal Eastern Counties Institution, Colchester.—630 males and females, all grades. Managers, The Board of Directors. Address communications to the Medical Superintendent. (*Class A.*)

The Co-operative Sanatorium, Billericay.—56 males of the middle class. Managers, The Co-operative Sanatoria, Ltd. (*Class A.*) See also p. 619

Gay Bowers, West Hanningfield, Chelmsford.—7 males. Manager, Mrs. Chennells. (*Class D.*)

FLINTSHIRE.

Walmer School for the Blind and Blind Deaf, Rhyl.—13 males and females. Feeble minded. Managers, Mrs. and Miss Roberts. (*Class D.*)

GLOUCESTERSHIRE.

Brentry Certified Institution, Westbury-on-Trym, Bristol.—For males. Res. Supt., T. R. Lambert; Med. Off., Dr. Ormerod. Hon. Sec., Rev. H. N. Burden. Clifton Down, Redland, or Patchway stations, $3\frac{1}{2}$ miles. (*Class A.*)

Hanham Hall, Hanham, near Bristol.—240 males. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*)

Poor Law Institution, Stapleton.—11 males, 9 females. Managers, Bristol Board of Guardians. Superintendent, L. W. Williams. (*Class A, B, C, and D.*)

Royal Victoria Home, Horfield.—42 females. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*)

St. Mary's Home, Painswick, near Stroud.—26 females. High grade feeble minded. Managers, Miss Wemyss, Washwell House, Painswick; S. G. Jones, Steanbridge House, near Stroud. (*Class A.*)

Stoke Park Colony, Stapleton, Bristol.—750 patients of both sexes (not exceeding 650 females or 300 males). Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*) See also p. 644

Stoke Park Colony, West Side, Stapleton.—178 males. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (*Class A.*)

Royal Fort Home, Bristol.—15 females, high grade mentally deficient. Managers, Ladies' Committee. Hon. Sec., Miss Savill, 27, Belgrave Road, Tyndall's Park. (Class D.)

HAMPSHIRE.

St. Mary's Home, Alton.—45 mentally and morally deficient females. Managers, The Wantage Community of Sisters. (Class A.)

Poor Law Institution, Parkhurst, Isle of Wight.—2 males, 2 females. Supt., J. McKeown. Managers, Isle of Wight Board of Guardians. (Class B.)

HERTS.

Hillside Special School for Mentally Defective Boys, Buntingford.—43 males. Secretary, T. W. Hunter, Archbishop's House, Westminster, S.W. 1. (Class A.)

St. Elizabeth's Home for Epileptics, Much Hadham.—136 males and females. Apply to T. W. Hunter, Archbishop's House, Westminster, S.W. 1. (Class A.)

KENT.

Princess Christian's Farm Colony, Hildenborough.—Males and females. Managers, National Association for the Feeble Minded. Superintendent, Miss McCloskey. (Class A. and D.)

LANCASHIRE.

Allerton Priory, R.C. Special Industrial School, Woolton, Liverpool.—106 male and female educable children. Superintendent, Sister Flannery. (Class A.)

Brockhall, Whalley, near Blackburn.—258 females. Feeble minded, imbeciles, and moral imbeciles. Managers, Mental Deficiency Acts Committee, Lancashire Asylums Board, Preston. (Class A.)

Pontville, R.C. Special School, Ormskirk.—106 boys. Mentally defective. Managers, Sisters of the Sacred Hearts of Jesus and Mary. Correspondent, Right Rev. Monsignor Canon Pinnington, 109, Great Mersey Street, Liverpool. (Class A.)

Royal Albert Institution, Lancaster.—480 males, 252 females. Managers, The Central Committee of the Royal Albert Institution, Lancaster. (Class A.)

See also p. 644

The Macalpine Rescue Home, 350, Moss Lane East, Manchester (temporary premises).—7 females. Managers, The Committee; Hon. Sec., Miss Macalpine. (Class A.)

Seafield House, Waterloo Road, Seaforth, near Liverpool.—210 males and females. Managers, Guardians of the West Derby Union, Liverpool. (Class B.)

Linthal, Freshfield, Liverpool.—Males only. Manager, Miss Bowyer. (Class C.)

LEICESTERSHIRE.

Cross Corners, Loughborough Road, Leicester.—20 females. Feeble minded. Managers, Leicester Corporation Mental Deficiency Committee. (Class A.)

LONDON.

Clifton House, 127, Uxbridge Road, Shepherd's Bush, W.—40 females. Feeble minded and moral imbeciles. Managers, The Church Army, Bryanston Street, W. (Class A.)

39, Downs Road, 41, Downs Road, 46-48, Pembury Road, Clapton, E.—80 females. Managers, Committee of Girls' Training Homes, Clapton. (Class A.)

Springfield Lodge, Grove Hill Road, Denmark Hill.—28 females. Managers, Salvation Army. (Class A.)

The Helping Hand Home, 16, Cathcart Hill, N.—30 females. High grade mentally deficient. Managers, Committee; Hon. Sec., Mrs. Geoffrey Russell, 39, Mecklenburgh Square, W.C. (Class A.)

Kensington Workhouse.—30 females. Managers, Guardians of the Poor of the Parish of St. Mary Abbots, Kensington. Supt., Mrs. B. Birch. (Class B.)

Woolwich Workhouse, Plumstead, S.E.—25 males and females. Temporary. Sent by L.C.C. only. Managers, Board of Guardians of the Woolwich Union. E. G. Manning, Supt. (Class B.)

MIDDLESEX.

All Souls' Special School, Pield Heath House, Hillingdon.—89 females. Educable and imbeciles. Manager, T. W. Hunter. (Class A.)

Bramley House, Clay Hill, Enfield.—45 females. Managers, Committee for the Care of the Mentally Defective, Middlesex County Council. (Class A.)

Crathorne, Oak Lane, East Finchley, N.—32, consisting of women with their infants. Managers, Northern Heights Branch of the National Association for the Feeble Minded; Hon. Sec., Mrs. Moss-Blundell. (Class A.)

Enfield House, 19, Chase Side Crescent, Enfield, Middlesex.—40 males. Managers, Guardians of Edmonton Union. Superintendent, E. B. Willett. (Class A.)

Warkworth House, Isleworth.—38 boys. Managers, Middlesex County Council. Superintendent, A. Milson. (Class B.)

Arniston, The Grove, Isleworth.—10 males under 14, 10 females. Managers, Misses J. M. and M. D. Isbister. (Class C.)

Normansfield, Hampton Wick.—120 males and females. Manager, Dr. Langdon-Down. (Class C.) See also p. 641

The Gables, Upper Teddington Road, Hampton Wick.—18 male and female children. Manager, Miss Frances M. Deck. (Class C.)

Alexander House, 117, High Street, Uxbridge.—24 females over 16. Managers, Committee. Supt., Miss E. Colliger. (Class D.)

Conifers, Hampton Wick.—10 females. Manager, Dr. Langdon-Down. (Class D.)

Trematon, Hampton Wick.—12 males. Manager, Dr. Langdon-Down. (Class D.)

NORFOLK.

The Lodge, Bowthorpe Road, Norwich.—20 females. Managers, The Guardians of the Poor of the Norwich Incorporation. (Class B.)

The Otleys, Seething, Norwich.—30 females, children and girls. Superintendent and Proprietress, Miss S. A. Huntly. (Class D.)

NORTHUMBERLAND.

Prudhoe Hall Colony, Prudhoe.—185, all classes. Managers, Northern Counties Joint Poor Law Committee. Clerk, J. W. Coulson, Poor Law Offices, South Shields. (Class B.)

Home of Industry, Bow Villa, Morpeth.—16 females. Feeble minded. Superintendent, Miss A. Pawsey. (Class D.)

OXFORDSHIRE.

(1) *Cunnor Rise, Oxford.* (2) 19, *New Inn Hall Street, Oxford.*—46 females. High-grade feeble-minded. Managers, Committee. Hon. Secretary, Honble P. Bruce. (Class A.)

SOMERSET.

Clevedon Hall, Clevedon.—58 females. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (Class A.)

Leigh Court, Abbot's Leigh, near Bristol.—260 females. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (Class A.)

Rock Hall House, Combe Down, Bath.—18 males, 19 females. Managers, Bath Municipal Charity Trustees. (Class A.)

Long Ashton Poor Law Institution, Flax Bourton, near Bristol.—5 males, 5 females. Managers, Guardians Long Ashton Union. (Class B.)

STAFFORDSHIRE.

Burton-on-Trent Poor Law Institution.—2 males, imbecile; 1 female, idiot. Managers, Guardians Burton Union. Master, R. Bareham. (Class A.)

New Cross Institution, Mental Wards, Wolverhampton.—1 male, 2 females. Cases accepted only from Wolverhampton County Borough Council. Managers, Wolverhampton Board of Guardians. (Class A.)

Poor Law Institution, Dudley, Stafford.—50 males, 50 females. Managers, Guardians of the Dudley Union. (Class A.)

SUFFOLK.

St. Joseph's Home, Sudbury.—11 females. Manager, Rev. A. Peacock. (Class A.)

Handford Home, Ranculagh Road, Ipswich.—20 females. Managers, The Committee. (Class D.)

SURREY.

Croydon Union House, Queen's Road, Croydon.—20 males, 3 females. Managers, Croydon Board of Guardians. (Class A.)

Royal Earlswood Institution, Redhill.—650. Managers, Board of Management. (Class A.)

SUSSEX.

Avonhurst, Burgess Hill.—20 private cases only, males and females under 16. Manager, Miss S. M. Macdowall. (Class C.)

Hastings and St. Leonard's Special School for Blind and Partially Blind Children who are also Mentally Defective, Backward, or Exceptional.—32 males and females. Manager, Principal and Committee. See also p. 619

St. Paul's House, Upper Maze Hill, St. Leonards-on-Sea.—For delicate, backward, or exceptional senior girls. School for juniors in separate house and grounds. Managers, The Principals. (Class D.)

See also p. 617

WARWICK.

Agatha Stacey Homes, Rednal, near Birmingham.—40 females; and *Ennis-kerry, Knowle.*—24 females. Managers, The Central Committee, 158, Broad Street, Birmingham. (Class A.)

Midland Counties Institution, Knowle, near Birmingham.—80 males, 44 females. Managers, The Committee. Superintendent, A. H. Williams. Medical Officer, J. O. Hollick, M.B. (Class A.)

Monyhall Colony, King's Heath, Birmingham.—283 males, 285 females. Managers, Guardians of the Poor of the Birmingham Union. Clerk and Solicitor, Sir James Curtis, Union Offices, Edmund Street, Birmingham. (Class A.)

WILTS.

Devizes Union Home.—10 females. Managers, Devizes Board of Guardians. (Class A.)

Pewsey Union Workhouse, Pewsey.—4 females. Managers, Pewsey Board of Guardians. (Class B.)

Poor Law Institution, Semington, near Trowbridge.—24 females. Managers, Guardians Trowbridge and Melksham Union. Supt., C. H. Taylor. (Class B.)

The Workhouse, Chippenham.—Managers, Guardians of the Chippenham Union. (Class B.)

WORCESTERSHIRE.

Fresham Union Workhouse.—Certified only for dealing with cases arising in the Evesham Union Area. Superintendent, J. H. Damen (Class A.)

YORKSHIRE.

Mid-Yorkshire Institution, Whitley, York.—70 males, 50 females. Managers. The Mid-Yorkshire Joint Board. Medical Superintendent, F. P. Hearder, M.D. (Class A.)

The Grange, Alofts, Normanton.—15 females, good class. Mentally deficient, epileptics. Manager, Mrs. Howard. (Class C.)

INSTITUTIONS FOR INEBRIATES.

LICENSED UNDER THE ACTS, 1879-1900.

The patient must sign a Form expressing a wish to enter the Home, before a magistrate. This can be done at the private residence of the patient, or at the retreat, if previous notice has been given. Two friends must also sign a declaration that they consider the patient an 'Inebriate' within the meaning of the Acts.

* NOTE:—Ashford is a Roman Catholic Religious Institution.

† Erdington, Herne Hill, Terrington St. Clement, and Torquay are C.E.T.S. Institutions.

MALES ONLY.

Buntingford (Herts).—*Buntingford House Retreat.* Apply, Med. Supt., Dr. G. M. Smith. Buntingford, G.E.R., 8 min.

Cockermouth (Cumberland).—*Ghyll-woods.* Res. Med. Prop., Dr. J. W. Astley Cooper. Cockermouth, 11 miles. (Closed during the War, owing to Proprietor's engagement at Military Hospital.)

Folkestone.—*Capel Lodge,* near Folkestone. Res. Prop., E. Norton, M.D. Folkestone Junction, 2 miles.

Rickmansworth (Herts).—*Dalrymple House.* Apply to Res. Med. Supt., Dr. F. S. D. Hogg. Rickmansworth station, Gt. Central & Metropolitan Rlwy, $\frac{1}{2}$ mile; L. & N.W.R., 1 mile. See also p. 626

FEMALES ONLY.

Ashford (Middlesex).*—*Ecclesfield.* Med. Supt., Dr. M. F. Cock. Apply, Mother Superior. Ashford station, 1 mile. See also p. 626

Belfast.—*The Lodge Retreat,* Irwin Avenue, Stranddown. Med. Attendant, R. W. Leslie, M.D.

Beverley (E. Yorks).—*Albion House.* Med. Supt., Dr. George Savege. Hon. Sec., Mrs. T. R. Penhith, The Limes, Sutton-on-Hull.

Erdington, near Birmingham.†—*Corngreaves Lodge.* Lady Supt., Miss Knapman. Med. Off., Dr. Featherstone. Gravelly Hill station, $\frac{1}{4}$ mile.

Herne Hill.†—*Ellison Lodge,* Half Moon Lane. Res. Supt., Sister Frances. Med. Supt., Dr. C. E. Finny. Herne Hill, 10 minutes; North Dulwich, 3 mins. Tel.: 1162 Brixton. See also p. 626

Leicester.—*Melbourne House.* Prop., Mr. H. M. Riley. Med. Attendant, R. Sevestre, M.A., M.D. Camb. London Consultant, W. Wynn Westcott, M.B. (Coroner N. E. London), 396, Camden Road, Holloway. Dublin Consultant, Sir Wm. J. Smyly, M.D., F.R.C.P.I., 58, Merrion Square, Dublin. Nat. Tel.: 769 Leicester. Station, 2 miles.

Newmains (N.B.).—*Newmains Retreat* for ladies. Hartwood station, Cal. Railway, 2 miles.

Reigate (Surrey).—*Duchurst,* for women of all classes. Under the Superintendence of Lady Henry Somerset. Med. Supt., A. Walters, M.R.C.S. Reigate, 4 miles.

Spelthorne St. Mary (Bedfont, Middlesex).—Apply to the Sister Superior, C.S.M.V. Med. Supt., Dr. H. W. Newton. Feltham, S.W.R., 1 mile.

Terrington St. Clement† (Norfolk).—*Hamond Lodge.* Res. Supt., Miss Yolland. Med. Supt., S. R. Lister, M.R.C.S. Terrington station, $1\frac{1}{2}$ miles. See also p. 626

Torquay.†—*Temple Lodge.* Res. Supt., Sister in Charge. Med. Off., W. Odell, F.R.C.S. Hon. Sec., Mrs. H. Erskine. See also p. 626

REFORMATORIES CERTIFIED UNDER THE INEBRIATES ACT, 1898.

FEMALES ONLY.

Langho (Lancashire).—*Lancashire Inebriate Reformatory,* Langho, near Black-

burn. For Lancashire cases. Res. Supt., and Med. Off., Dr. F. A. Gill. Langho station, $1\frac{1}{2}$ miles.

UNLICENSED HOMES.

Beckenham (Kent).—*Norwood Sanatorium*. The Mansion, Beckenham Park. Med. Supt., F. Hare, M.D. Beckenham Junc. station, 10 mins. *See also p. 000*

Dublin.—*Farnham House*, Finglas. Res. Med. Supt., H. P. D'Arcy Benson, M.D. Dublin, 2 miles.

London.—*London Sanatorium*, 150, Harley Street, W. Res. Med. Supt., C. A. McBride, M.D.

Maldon (Essex).—*Osea Island* (for ladies and gentlemen). Vis. Phys., H. J. Price, F.R.C.S. Prop., F. N. Charrington, Esq.

SANATORIA FOR CONSUMPTION AND OTHER FORMS OF TUBERCULOSIS.

Aberchalder (N.B.).—*Inverness-shire Sanatorium*. Med. Supt., D. S. Johnston, M.D. Aberchalder, 2 miles.

Aysgarth, S.O. (Yorks).—*Wensleydale Sanatorium*. Physicians, D. Dunbar, M.B., B.S., and W. N. Pickles, M.B., B.S. Aysgarth, $\frac{1}{2}$ mile, via Northallerton, N.E.R. and Hawes Junction, M.R.

See also p. 620

Banchory (Scotland).—*Nordrach-on-Dee*. Res. Phys., D. Lawson, M.A., M.D. Banchory, $1\frac{1}{2}$ miles.

Barrasford (Northumberland).—*The Newcastle-on-Tyne and Northumberland Sanatorium*. Res. Med. Supt., Dr. C. G. R. Goodwin. Barrasford, N.B.R., $3\frac{1}{2}$ miles.

Belbroughton (Worcs.).—*Bourne Castle Sanatorium*. Res. Phys., W. Bernard Knobel, M.D. Hagley, G.W.R.

Benenden (Kent).—*Sanatorium of "National Association for the Establishment and Maintenance of Sanatoria for Workers suffering from Tuberculosis."* Res. Med. Supt., A. Niven Robertson, M.D. Biddenden, 3 miles.

Bingley (Yorks.).—*Eldwick Sanatorium* (school for phthisical children). Med. Off., Dr. Margaret S. Sharp. Bingley station, 2 miles.

Birmingham (near).—*Romsley Hill Sanatorium*, Halesowen. Res. Med. Off., Dr. P. Allan. Hunnington, Mid. & G.W.R., 2 miles.

Bolton (Lancs.).—*Wilkinson Sanatorium for Consumptives*, Sharples. Med. Off., Dr. J. D. Marshall.

Bournemouth.—*Royal National Sanatorium for Consumption and Diseases of Chest*. Sec., A. G. A. Major. Res. Med. Off., W. Bertram Lawrence. Bournemouth Central, $1\frac{1}{2}$ miles; Bournemouth West, $\frac{1}{2}$ mile.

The Firs Home (for advanced cases). Hon. Sec., Col. R. F. Anderson. Bournemouth. Hon. Med. Offs., C. P. Woodstock, M.D., and S. G. Champion, M.D. Lady Supt., Miss Ingram. Bournemouth Central, $\frac{1}{2}$ mile.

The Home Sanatorium, West Southbourne, near Bournemouth. Res. Med. Supt., J. E. Esslemont, M.B., Ch.B. Bournemouth Central, $2\frac{1}{2}$ miles; Boscombe, $1\frac{1}{2}$ miles; Christchurch, $2\frac{1}{2}$ miles.

See also p. 620

Bridge of Weir (Renfrewshire).—*Consumption Sanatoria of Scotland*. Hon. Treas., Sir Joseph P. Maclay, Bart., 21, Bothwell Street, Glasgow. Med. Supt., James Crockett, M.D. Bridge of Weir, 2 miles.

Brighton.—*Municipal Sanatorium*, for Brighton townsfolk only (early pulmonary and joints). Med. Supt., Dr. Duncan Forbes, M.O.H. for Brighton. Particulars, Town Hall, Brighton.

Chagford (Devon).—*Dartmoor Sanatorium*. Res. Med. Supt., Dr. C. H. Berry. Moretonhampstead, G.W.R., 6 miles.

Chelmsford (Essex).—*Great Baddow Sanatorium*. Med. Supt., A. Lyster, M.D. Chelmsford, G.E.R.

Cheltenham.—*Cranham Lodge Sanatorium*, Stroud, Glos. Res. Med. Supts., A. H. Hoffman, M.D., and Geoffrey A. Hoffman, M.B. Cheltenham, 8 miles.

Salterley Grange Sanatorium, near Cheltenham. Res. Med. Supt., Dr. E. G. Glover. Leckhampton, $2\frac{1}{2}$ miles; Cheltenham, $3\frac{1}{2}$ miles.

Chesterfield (Derbyshire).—*Ashover Sanatorium*. Med. Supt., Dr. James Wall. Stretton, M.R., $3\frac{1}{2}$ miles.

Darlington.—*Felix House*, Middleton St. George, Co. Durham. Res. Med. Supt., C. S. Steavenson, M.B. Dinsdale, N.E.R., 3 minutes.

Devon and Cornwall Sanatorium, Didworthy, South Brent. For consumptive poor of the two counties. Sec., S. Carlile Davis, Esq., 5, Princess Square, Plymouth. Res. Med. Supt., Dr. W. B. Livermore. Brent, G.W.R., 2 miles.

Doneraile (Co. Cork).—*Cork County and City Sanatorium*, Heatherside. Res. Med. Supt., Dr. R. Ahern. Buttevant, G.S. & W.R., 5 miles.

Dublin. — *Peamount Sanatorium*, Hazelhatch, Dublin. Med. Supt., A. H. Hanley, C.M.G., F.R.C.S.I. Lucan or Hazelhatch, Gt. Southern Railway.

Dundee (near). — *Sidlaw Sanatorium*. Med. Supt., H. E. Fraser, M.D., Royal Infirmary, Dundee. Auchterhouse station, $1\frac{1}{2}$ miles.

Durham. — *Durham County Consumption Sanatoria*. Sec., Mr. F. Forrest, 54, John Street, Sunderland. For men: Stanhope, Med. Supt. Lieut.-Col. John Gray, R.A.M.C. Stanhope station, 1 mile. For women and children: Wolsingham, Med. Supt., Dr. Menzies. Wolsingham station, $\frac{3}{4}$ mile.

Edinburgh. — *Royal Victoria Hospital for Consumption*. Under the Corporation of the City of Edinburgh, and the supervision of the Public Health Department, City Chambers, Edinburgh.

Eversley (Hants). — *The Sanatoria*. Res. Med. Supt., J. G. Garson, M.D. Welling-ton College station, $4\frac{1}{2}$ miles; Wokingham station, 6 miles; Fleet, 6 miles.

Farnham (Surrey). — *Whitmead Sanatorium*, Tilford, near Farnham. Med. Supt., Geo. Fleming, M.B. Farnham station, $3\frac{1}{2}$ miles.

Fortbreda, Belfast. — *Forster Green Hospital for Consumption and Chest Diseases*. Sec., J. Osborne, 2, Welling-ton Place, Belfast. Belfast, 2 miles.

Frimley (Surrey). — *Brompton Hospital Sanatorium*. Res. Med. Supt., Dr. W. O. Meek. Frimley station, 2 miles.

See also p. 607

Grange-over-Sands. — *Westmoreland Sanatorium*, Meathop. Res. Med. Supt., C. F. Walker, M.D. Grange-over-Sands station, $2\frac{1}{4}$ miles.

Hastings. — *Fairlight Sanatorium*, in connection with Margaret Street Hospital for Consumption (for Out-Patients), 26, Margaret St., W. Sec., Mrs. M. C. Hawthorne. Med. Off., Dr. N. F. Stallard. Hastings, tram, about 15 minutes.

Heswall (Cheshire). — *West Derby, Liverpool, and Toxteth Park Joint Sanatorium for Children*. Med. Supt., J. B. Yeoman, M.D. Matron, Miss Bateson. Heswall, $1\frac{1}{2}$ miles.

Hull. — *Hull and East Riding Convalescent Home*, Withernsea. Sec., Benjamin Brooks, Royal Infirmary, Hull. Med. Off., A. E. Sproule, L.R.C.P. Withernsea station.

Isle of Wight. — *Royal National Hospital for Consumption*, Ventnor. Senr. Res. Med. Off., Dr. D. Morrison Smith. Sec.,

Charles W. Cox, 18, Buckingham Street, Strand, W.C. Ventnor, 1 mile.

St. Catherine's Home, Ventnor (for early cases of phthisis in children). Apply Sister-in-Charge. Med. Off., H. F. Bassano, M.A., M.B. Ventnor, 5 minutes' drive.

Kinross-shire (Scotland). — *Ochil Hills Sanatorium*, Milnathort. Res. Med. Supt., James Aberdein Milne, M.B. Milnathort, 3 miles.

Kirkcaldy. — *Sanatorium for Consumption*. Med. Supt., Dr. G. W. McIntosh. Sec., The Town Clerk. Kirkcaldy, 1 mile.

Lanark. — *City of Glasgow Sanatorium*, Bellefield, Lanark. Phys. Supt., Dr. J. W. Allan. Lanark, 20 minutes.

Lanchester (Durham). — *Maiden Law Sanatorium*. Med. Off., Dr. W. M. Morison. Sec., W. H. Ritson. Annfield Plain station, 1 mile.

Lancing-on-Sea, Worthing. — *Southern Convalescent Homes and Sanatorium*. Med. Off., A. E. Rouse, L.R.C.P. Sec., W. Chorley, 6, Clephane Road, Canonbury, N. See also p. 620

Leeds. — *Leeds Sanatorium for Consumptives*, Gateforth, near Selby, and *Leeds Hospital for Consumptives*, Armley. For poor of Leeds. Sec., C. H. Sedgwick, 37, Great George Street, Leeds.

Liverpool. — *Liverpool Sanatorium for Consumptives*, Kingswood, Frodsham. Sec., Liverpool Hospital for Consumption, Mount Pleasant, Liverpool. Res. Phys., Alfred Adams, M.D. Frodsham, L. & N.W.R., $3\frac{1}{2}$ miles.

Park Hill Sanatorium, Liverpool. Med. Supt., H. R. Macintyre, M.D.

Llanybyther (Carmarthenshire). — *West Wales Sanatorium*. The Welsh National Memorial to King Edward VII. Act. Res. Med. Supt., Dr. D. C. Lloyd. Llanybyther station, 3 miles.

London. — *City of London Hospital for Diseases of Chest*, Victoria Park, E. Apply, Secretary. Cambridge Heath, Bus or Tram, 5 mins.

Mount Vernon Hospital for Consumption and Diseases of the Chest, Northwood. Northwood (Met. & G.C. Rly.). Hon. Vis. and Res. Staff. Out-patient department, 7, Fitzroy Square, W. Secretary, W. J. Morton.

Royal Hospital for Diseases of the Chest, 231, City Road, E.C. Apply to the Secretary.

Long Stratton (Norfolk). — *Fritton Sanatorium*. Med. Director Dr. Annie McCall, 165, Clapham Road, S.W. Forncett station, G.E.R., 4 miles.

Manchester.—*Hospital for Consumption and Diseases of Throat and Chest*, Bowdon; *Crossley Sanatorium*, Delamere, Cheshire. (For poor and working classes, after personal examination at Manchester.) Sec., C. W. Hunt, Manchester.

Margate (Kent).—*Royal Sea-bathing Hospital* (for Surgical Tuberculosis). Sec., A. Nash, 13, Charing Cross, S.W. Margate West, $\frac{1}{2}$ mile.

Mendip Hills.—*Mendip Hills Sanatorium*, Wells, Somerset. Res. Phys., D. J. Chowry Muthu, M.D. Wells station, 3 miles. See also p. 621

Nordrach-upon-Mendip, Blagdon, nr. Bristol. Res. Phys., R. Thurnam, M.D. Burrington station, 5 miles.

Midhurst (Sussex).—*King Edward VII Sanatorium*. Res. Med. Supt., T. T. Cockill. Midhurst, 4 miles.

Nayland (Suffolk).—*East Anglian Sanatorium*, with *Mallings Farm Sanatorium* for poorer men and women patients, and *East Anglian Children's Sanatorium*. Med. Supt., Dr. Jane Walker, 122, Harley Street, W. Bures station, G.E.R., $3\frac{1}{2}$ miles.

New Cumnock (Ayrshire).—*Ayrshire Sanatorium*, Glenafton. Res. Med. Supt., E. E. Prest, M.D. New Cumnock, 3 miles.

Norfolk.—*Kelling Sanatorium*, Holt. Res. Med. Supt., Dr. J. I. W. Morris. Holt, $1\frac{1}{2}$ miles.

Mundesley Sanatorium, Mundesley. Res. Phys., S. Vere Pearson, M.D. Mundesley, 1 mile.

Northampton.—*Northamptonshire Sanatorium*, Cretton. Res. Med. Supt., Dr. Edward Bigg. Brixworth, L. & N.W.R., 3 miles.

Nottingham.—*Ransom Sanatorium*, Sherwood Forest, Mansfield. Res. Med. Off., Dr. Ethel Dukes. Mansfield, 3 miles.

Oban, Scotland.—*Argyll County Sanatorium*. Vis. Med. Off., Duncan Mac Donald, M.D. Oban, 1 mile.

Ockley (Surrey).—*Ockley Sanatorium*. Ockley, L.B. & S.C.R., 1 mile.

Painswick, near Stroud (Glos.).—*Painswick Sanatorium*. Res. Phys. and Prop., W. McCall, M.D. Stroud, 4 miles; Gloucester, 6 miles.

Peebles.—*Manor Valley Sanatorium*. Med. Off., C. B. Gunn, M.D. Peebles, 4 miles, Lyne, 2 miles.

Penmaenmawr (N. Wales).—*Nordrach in Wales*, *Pendyffryn Hall*. Res. Phys., Dr. G. Magill Dobson, and Dr. Geraty.

Peppard Common (Oxon).—*Berks. and Bucks. Joint Sanatorium*. Res. Chief Med. Off., Dr. Esther Carling. Reading, $6\frac{1}{2}$ miles.

Ringwood (Hants).—*Linford Sanatorium*. Res. Phys., H. G. Felkin, M.D., A. de W. Snowden, M.D., and H. A. F. Wilson, M.R.C.S. Ringwood sta., $2\frac{1}{2}$ mls.

Rudgwick (Sussex).—*Rudgwick Sanatorium*. Vis. London Phys., Dr. Annie McCall, 165, Clapham Road, S.W. Rudgwick station, 5 minutes.

Ruthin (N. Wales).—*Vale of Clwyd Sanatorium*, *Llanbedr Hall*. Res. Med. Supt., H. Morriston Davies, M.D. Ruthin station, 2 miles.

St. Leonards.—*Eversfield Chest Hospital*, West Hill. Res. Phys., T. Gambier, M.D. West St. Leonards, S.E.R., West Marina, L.B. & S.C.R., within 5 minutes' walk.

Sandon, near Chelmsford (Essex).—*Merivale Sanatorium*. Res. Phys., H. N. Marrett, M.R.C.S. Chelmsford station, G.E.R., $3\frac{1}{2}$ miles. See also p. xxxiv

Sheffield.—*City Hospitals for Consumptives*, Crimicar Lane (for males); Commonsides (for females). Med. Supt., H. J. E. H. Williams, M.D.

Shirlett, near Broseley (Shropshire).—*King Edward VII Memorial Sanatorium*. Med. Supt., Dr. T. R. Elliott. Much Wenlock station, 3 miles.

Skipton (Yorks).—*Eastby Sanatorium*. Res. Med. Supt., Dr. Catherine Arnott. Embsay station, 2 miles.

Stannington (Northumberland).—*"Philipson" Children's Sanatorium*. Matron, Miss J. M. Campbell. Two Vis. Physicians and Surgeon. Stannington station, 3 miles.

Trelkeld (Cumberland).—*Blencathra Sanatorium*. Res. Med. Supt., Dr. W. Goodechild. Threlkeld, C.K. & P.R., 2 m.

Torquay.—*Western Hospital for Incipient Consumption*, Torquay. Open Oct. to May. Sec., W. F. Munley. (Temporarily in use as a War Hospital.)

Warrenpoint (Co. Down).—*Rostrevor Sanatorium*. Res. Phys., B. H. Steede, M.D. See also p. 621

Wicklow.—*The Royal National Hospital for Consumption for Ireland*, New-castle, Wicklow. Res. Med. Off., Dr. F. O'B. Kennedy. D. & S.E.R. to New-castle, Co. Wicklow, 3 miles.

Winsley, near Bath.—*Winsley Sanatorium*. Senr. Res. Med. Off., Dr. H. W. M. Rees. Sec., Frederic Jones. Limpley Stoke station, 1 mile.

Wokingham.—*Pinewood Sanatorium*. Res. Med. Supt., Francis Clark, M.D. Wellington College, S.E.R., 2 miles; or Wokingham, S.W.R., $3\frac{1}{2}$ miles.

Worcester (near).—*Knightwick Sanatorium*. Res. Med. Supt., Dr. H. Gordon-Smith. Knightwick, N.W.R., $1\frac{1}{2}$ mile.

HYDROPATHIC ESTABLISHMENTS.

Ben Rhydding (Yorkshire).—*Ben Rhydding Hydro.* Phys., Dr. W. R. Bates. Station, a few hundred yards.

Birmingham.—*The City Hydropathic and Massage Establishment*, 275, Broad Street. Proprietor, Robert Schenkel (*Swiss*).

See also p. 616

Bournemouth (Hampshire).—*Bournemouth Hydropathic.* Res. Phys., W. J. Smyth, M.D.. East station, $1\frac{1}{2}$ miles; West station, $\frac{1}{2}$ mile.

Bristol.—*The Bristol Hydropathic*, College Green. Res. Phys., W. J. Spoor, M.B., M.R.C.S. Temple Meads, $1\frac{1}{2}$ miles.

Bute.—*Kyles of Bute Hydropathic*, Port Bannatyne, Rothesay. Man., A. Menzies. Clyde steamers call daily.

Buxton.—*Buxton Hydro Hotel.* Manager, G. W. Bosworth. Station, 4 mins.

Caterham (Surrey).—*Caterham Sanitarium and Surrey Hills Hydropathic.* Res. Med. Supt., A. B. Olsen, M.D. Caterham station.

See also p. 621

Clifton (near Bristol).—*Clifton Grand Spa Hotel.* Clifton Down station, 1 mile; Bristol station, $1\frac{1}{2}$ miles.

Cork.—*St. Ann's Hill Hydropathic.* Res. Med. Supt., Dr. R. H. Barter. Blarney station, $2\frac{1}{2}$ miles; Cork, 8 miles.

Crieff.—*Strathearn Hydro.* (17 miles from Perth). Res. Med. Supt., T. Gordon Meikle, M.B., C.M. Crieff station, 1 mile.

Eastbourne.—*Eastbourne Hydropathic.* Eastbourne station, 5 minutes' drive.

Edinburgh.—*Hydropathic*, Slateford. (*Temporarily used as a War Hospital.*)

Forres.—*Cluny Hill Hydropathic.* Vis. Phys., Dr. John Adam. Forres station, 1 mile; Inverness, 24 miles.

Grange-over-Sands.—*Haslewood Hydro.* Carnforth, L. & N.W.R., then by Furness Railway; Grange-over-Sands, $\frac{1}{2}$ mile.

Harrogate (Yorkshire).—*Harlow Manor Hydro.* Man., Miss Oakley.

The Harrogate Hydropathic Lim. Phys., Dr. Hinsley Walker. Man., W. Taylor. Harrogate station, $\frac{1}{2}$ mile.

Hexham (Northumberland).—*Tynedale Hydropathic.* Prop., F. G. Grant. Med. Supt., Dr. D. Stewart. Hexham, 1 mile; Newcastle, 19 miles.

Ilfracombe.—*The Cliffe Hydro.* Med. Supt., C. W. E. Toller, M.D.

Ilkley (Yorkshire).—*Craiglands Hydro.* Res. Physicians, Henry Dobson, M.D., C.M. (Edin.), and Maurice R. Dobson, M.B., B.S. (Lond.), L.R.C.P., M.R.C.S. (Eng.).

See also p. 628

The Spa Hydro. Hotel, Ilkley. Man., J. S. Brodie. Vis. Phys., Dr. Henry Veale. Ilkley, 3 minutes.

Limpley Stoke (near Bath).—*West of England Hydropathic.* Apply, the Secretary. Limpley Stoke station.

Malvern.—*The Malvern Hydropathic.* Res. Phys., J. C. Fergusson, M.D. Great Malvern station, $\frac{1}{2}$ mile.

Wyche-side Hydropathic, Malvern. Malvern Wells station, G.W.R., $\frac{1}{2}$ mile; Great Malvern station, 2 miles.

Imperial Hotel, Malvern. The Manager. Telephone: No. 5.

Matlock.—*Rockside Hydropathic*, Matlock. Res. Med. Supt., Dr. Marie Goodwin-Orme. Matlock, $\frac{1}{2}$ mile.

Royal Hotel and Baths, Matlock Bath.

Smedley's Hydropathic, Matlock. Res. and Vis. Physicians. Matlock station, $\frac{1}{2}$ mile; omnibus. See also p. 627

Moffat.—*The Moffat Hydropathic.* Man., Miss Gardner. Med. Supt., Dr. D. Huskie. Moffat station, 1 mile.

Peebles.—*Peebles Hotel Hydropathic.* Res. Phys., Thomas D. Luke, M.D., F.R.C.S. Edin. N.B. and Cal. stations about 10 to 15 minutes' walk.

Shandon.—*Shandon Hydropathic.* Consulting Phys., Dr. Wm. R. Sewell. Shandon, 5 minutes.

Southport (Birkdale Park).—*Smedley Hydropathic.* Phys., J. G. G. Corkhill, M.D. Southport or Birkdale stations.

See also p. 628

Kenworthy's Hydropathic, Southport. Res. Phys., Dr. A. B. Kenworthy. Chapel Street (L. & Y.). Telephone, 80. Tel.: "Kenworthy's, Southport."

See also p. 628

Tunbridge Wells.—*The Spa.* Station, about 1 mile. Apply, Manager.

Ulverston.—*Conishead Priory Hydropathic.* Visiting Physician, Dr. Robert Ashburner. Ulverston station, $1\frac{1}{2}$ miles.

NURSING INSTITUTIONS AND PRIVATE HOMES FOR INVALIDS.

NURSING INSTITUTIONS.

Liverpool.—*Male and Female Nurses' Institution*, Hope House, Hope Street.

See also p. 614

London.—*Incorporated Society of Trained Masseuses*, 157, Great Portland Street, W.

See also p. 610

Male Nurses' Association, 29, York Street, Baker Street, W. 1. Sec., W. J. Hicks.

See also p. 611

Mental Nurses' Co-operation, 49, Norfolk Square, W. 2, and *Norfolk Square Nurses' Club*, 51 and 53, Norfolk Square, W. 2. Lady Supt., Miss Jean Hastie. Paddington, 7 minutes.

See also p. 612

St. Luke's Hospital, Old Street, E.C. Trained Nurses for Mental and Nervous Cases. Apply, Lady Supt., 19, Nottingham Place, W. 1.

Temperance Male Nurses' Co-operation, Ltd., 43, New Cavendish Street, W.; also at Manchester, Glasgow, and Dublin. Apply Secretary.

See also p. lvi

The Nurses' Association, 29, York Street, Baker Street, W. 1. Sec., W. J. Hicks; Supt., Mrs. Millicent Hicks.

See also p. 611

York.—*The Retreat* (Trained Nurses' Department, for mental and nervous cases only).

See also p. 639

PRIVATE HOMES FOR INVALIDS, MATERNITY HOMES, INSTITUTIONS FOR SPECIAL TREATMENTS, Etc.

Alderley Edge (Cheshire).—*The David Lewis Colony* (for Sane Epileptics), and *Colthurst House School* (for epileptic boys). Res. Director, Alan McDougall, M.D. Alderley Edge, 3 miles. *See also p. 619*

Alresford (Hants).—*Beauworth Manor*. Invalids, any cases except insanity. Speciality: Neurosis. Apply, Res. Superintendent. Alresford, 5 miles; Winchester, 8 miles. *See also p. 616*

Bath.—*Lansdown Hospital and Nursing Home*, Bath (invalids only; special arrangements for patients suffering from gout, rheumatism, and physical infirmities). Med. Supts., Dr. Percy Wilde and Dr. Wells-Beville. M. or G.W. stations, 1 mile. *See also p. 614*

Chertsey (Surrey).—*Harcourts*, for a mild, mental, borderland, or nervous case. Dr. Forbes Alexander. *See also p. xxxv*

Edinburgh.—*Queensberry Lodge*, for ladies. Supt., A. Miller. Med. Supt., Dr. William Russell. Waverley station, $\frac{1}{2}$ mile. *See also p. 615*

Hadlow Down, Buxted (Sussex).—*South Beacon* (for the care and treatment of gentlemen mentally affected, but not ill enough to be certified). Prop., Philip H. Harmer. Buxted, 3 miles; Mayfield, 4 miles; Heathfield, 4 miles.

See also p. 618

Hastings.—*St. Helen's House*. Neurasthenia, Hysteria, War Shock and Convalescents. Res. Prop., Dr. B. A. Molyneux. *See also p. 636*

Hereford.—*Carlton House*, St. John's Street. Medical, rest-cure, nerve, borderland, and residential home for ladies. Lady Supt., Mrs. Clarke Whitfield.

See also p. 617

High Wycombe (Bucks.).—*Adremont Nursing Home*, for medical, surgical, midwifery, and slight-nerve patients. Matron. *See also p. 642*

Jedburgh.—*Abbey Green* (for Invalids and War Convalescents). Res. Prop., Wm. Blair, M.D. N.B.R., Jedburgh. Telephone: No. 3.

Kenley (Surrey).—*Kenley House Nursing Home*, for ladies and gentlemen needing rest and care. Surgical, medical, rest cure. Miss Haslock. *See also p. xxxv*

London.—*Faraday House*, 85, West Side, Clapham Common, S.W. Medical, electricity, radiant heat, radium, Weir-Mitchell, and Nauheim treatment. Apply, Secretary.

Radium Institute, 16, Riding House Street, W. Med. Supt., A. E. Hayward Pinch, F.R.C.S. *See also p. 613*

St. Thomas's Home, St. Thomas's Hospital, Westminster Bridge. Apply, The Steward, St. Thomas's Hospital, S.E. Waterloo, 5 minutes. Tel.: Hop. 1637. *See also p. 615*

Muchalls (Kincardineshire). — *Elsick House*, for private and invalid gentlemen. Lessee, J. Niven. *See also p. 618*

New Brighton.—*Convalescent Home for Women and Children*. Hon. Sec. and Treas., Frank Holt, Esq., 8, Cook Street, Liverpool. Lady Supt., Miss K. R. Bolton. *See also p. 615*

Peebles, N.B.—*St. Ronan's* (for two or three mild mental cases). Med. Supt., Thomas D. Luke, M.D. Peebles, $\frac{1}{2}$ mile. *See also p. 618*

Ryde, I.W.—*St. Luke's Home*, for epileptic churchwomen, Ryde, I.W. Med. Supt., S. Churchill, M.A., M.B. (Cantab.). Address, Deaconess.

Tunbridge Wells.—*Mount Ephraim Nursing Home*, 8, Molyneux Park. Medical, surgical, Weir-Mitchell, and massage cases. Excellent facilities for open-air treatment. Apply, Miss Baxter. S.E. & Chatham station, 10 minutes. *See also p. 616*

Whitchurch, Salop.—*St. Mary's House*. Limited number of mild mental cases (ladies). Dr. and Mrs. Gwynn. *See also p. 643*

PRINCIPAL BRITISH SPAS,

WITH INDICATIONS FOR THEIR THERAPEUTICAL EMPLOYMENT.

Bath (Somerset).—Sheltered from N. and N.E. winds by a range of hills from 600 to 800 feet high; 2 hours from London. Rainfall moderate. Climate mild and equable.

Waters.—The only *hot* springs, and the only *winter* spa, in Great Britain. Three thermal springs; the temperature of the hottest is 120° F. The waters contain chiefly sulphates of calcium, sodium, and chloride of magnesium, and are strongly radio-active.

Therapeutic indications.—Gout, chronic rheumatism, rheumatoid arthritis, sciatica, disorders of the digestive organs, anæmia, skin diseases, functional nervous disorders and debility.

Baths.—Modern baths of every description and Zander medico-mechanical treatment.

Nursing and Baths.—Lansdown Grove House (*See p. 614*).

Bridge of Allan (Stirlingshire).—422 miles from London. Sheltered from N. and N.E. winds by the Ochil Hills. Average rainfall 33 inches. Climate mild and equable.

Waters.—Natural saline mineral springs (Airthrey).

Therapeutic indications.—Chronic affections of the liver, stomach, and bowels, in many chest diseases, rheumatism, gout, sciatica, and in some diseases of the skin.

Baths.—Excellent suite of baths.

Buxton (Derbyshire) (*See also p. 622*).—The Mountain Spa, 1000 feet above sea level, 3½ hours from London. Climate, dry and bracing. Lowest humidity.

Waters.—Thermal springs 82° F. Powerful radio-active properties and highly charged with nitrogen gas. Chalybeate spring, rich in ferrous carbonate.

Therapeutic indications.—Gout, rheumatism, rheumatoid arthritis, sciatica, nervous diseases, skin diseases, colitis, anæmia, phlebitis, and diseases of women.

Baths.—Over 100 different treatments. Every proved balneological and accessory treatment installed.

Boarding Establishment.—The Buckingham Boarding Establishment (*See p. 625*).

Cheltenham (Gloucestershire).—184 feet above sea level, 3 hours from London. Protected from N. and N.E. winds. Climate mild. Average rainfall 30 inches.

Waters.—Of four kinds: twin salt saline, sodium sulphate saline, alkaline saline, and magnesium and calcium saline.

Therapeutic indications.—Gout, dyspepsia, metabolic disorders generally, chronic gastric and hepatic troubles, and neurasthenia.

Baths.—Good modern baths, with massage.

Church Stretton (Salop).—613 feet above sea level. 3½ hours from London. Pure bracing air, and a generally invigorating climate. Prevailing wind, S.W. Average rainfall 33 inches.

Waters.—Said to be the purest in Great Britain.

Therapeutic indications.—Specially the 'open-air' cure of neurasthenia, for sequelæ of influenza, for insomnia, functional nervous diseases, chronic gout and rheumatism, chronic gastric and bronchial catarrh, debility from over-work, and convalescence after illness or operation.

Droitwich (Worcestershire) (*See also p. 623*).—150 feet above sea level, 2½ hours from London. Average rainfall 23 inches. Mean winter temperature 47° F., summer 69·9° F. Well protected from N. and N.E. winds.

Waters.—The most powerful saline in the world. Temperature 54° F., and is heated by introducing steam. It is 10 to 12 times as strong as that of the ocean (Channel), containing in every gallon 20,000 grains of saline in excess of any known waters: the waters possess radio-active properties.

Therapeutic indications.—Chronic muscular and articular rheumatism, rheumatoid arthritis, chronic articular or irregular gout, neuritis, sciatica, neuralgia, heart diseases, especially those of myocardium—effect similar and equal to Nauheim treatment—neurasthenia, anæmia, chlorosis, some sclerotic diseases of spinal cord, dry, scaly skin diseases, e.g., chronic eczema and psoriasis.

Baths.—Immersion, douche, needle, vapour, swimming, Aix-douche, Nauheim baths, etc.

Hotel.—Worcestershire Brine Baths Hotel, and Brine Baths (*See p. 623*).

Harrogate (Yorkshire) (*See also p. xxxiv*).—450 feet above sea level, 4 hours from London. Unequalled by any Continental spa, especially for the treatment of gout and its complications. The climate is stimulating and fairly dry—bracing moorland air. Average rainfall 29 inches.

Waters.—Celebrated for the medicinal properties of its 87 springs—sulphurous, chalybeate, alkaline, and saline. ‘Aquaperia’ aperient mineral water is bottled at Harrogate by Camwal Ltd. (*See p. 557*).

Therapeutic indications.—Anæmia, chlorosis, gout, rheumatism, disorders of liver and stomach, muco-membranous colitis, chronic appendicitis, and skin diseases.

Baths.—There are four establishments, where nearly 70 treatments are given, including sulphur baths, douche, Nauheim, vapour, Russian, Turkish, electric, mineral, electric light, ozone, throat and nasal.

Ilkley (Yorkshire).—Situated on the southern slope of the valley of the Wharfe. Occupying a sheltered position. Average rainfall 32 inches. Mean annual temperature 48° F. Bracing and invigorating moorland air.

Waters.—The water supply obtained from springs is remarkably pure, bright and sparkling. Chalybeate waters. Saline.

Therapeutic indications.—Gout, rheumatism, neuritis, neurasthenia, anæmia, asthma, and bronchitis cases are benefited. The treatment adopted is that known as hydrotherapeutic.

Baths.—Complete suites of baths are to be found in the numerous establishments. Electrical, Weir-Mitchell.

Hydropathic Establishment.—Craiglands Hydropathic (*See p. 628*).

Leamington Spa (Warwickshire) (*See also p. xxxiii*).—195 feet above sea level, 1 hour 30 minutes from London. Equable and mild climate. Average rainfall 24 inches. Westerly winds prevail.

Waters.—Saline, resembling those of Homburg, but more generally useful.

Therapeutic indications.—Muscular and articular rheumatism, gout, rheumatoid arthritis, neuralgia and neuritis, diseases arising from a plethoric condition of the chylipoietic viscera, eczema and other irritative disorders of the skin, conditions of increased vascular tension and chronic interstitial nephritis.

Baths.—Turkish, ‘whirlpool,’ swimming, and electric of all kinds.

Llandrindod Wells (Radnorshire).—Situated in Central Wales, at an altitude of 750 feet. About 5 hours from London. Sheltered from the east. Climate extremely bracing. Average rainfall 35 inches.

Waters.—Saline, sulphurous, iron, magnesium, chloride of calcium, and lithia springs. Slightly aperient and strongly diuretic.

Therapeutic indications.—Digestive disorders, gout and rheumatism, rheumatoid arthritis, neuritis and fibrositis, gall-stones and biliary stasis, renal calculus, or any kidney or bladder condition requiring diuresis, and in neurasthenia, or debility from over-work or convalescence.

Llangammarch Wells (Breconshire).—600 feet above sea level. 5½ hours from London. Well protected from the east, and prevailing wind is S.W. Average rainfall 58 inches.

Water.—Saline, containing the chlorides of barium (6½ grains per gallon), calcium, magnesium, lithium, and sodium; the only one of its kind in the British Isles.

Therapeutic indications.—Cardiac diseases, organic and inorganic, especially affections of the myocardium due to influenza. Graves’s disease, chronic muscular and articular rheumatism, osteo-arthritis, gout, sciatica, and neurasthenia.

Hotel.—Lake Hotel (*See p. 621*).

Malvern (Worcestershire).—520 feet above sea level. 2½ hours from London. Air dry and bracing. Prevailing winds S.W. and W. Average rainfall 28 inches.

Waters.—Mainly spring, of remarkable purity, free from organic matter, less than 4 grains of earthy salts per gallon.

Therapeutic indications.—Gout, rheumatism, rheumatoid arthritis, neuralgia, sciatica, lumbago, dyspepsia, constipation, anæmia, bronchial nephritic, and cutaneous diseases.

Baths.—Natural pure brine (from Droitwich), Turkish and electric baths. Vichy massage and Aix douches, Fango-di-Battaglia.

Matlock Bath (Derbyshire).—300 to 800 ft. above sea level, 3½ hours from London. Average rainfall 35 inches. Very sheltered.

Waters.—Thermal springs. Mild sulphated alkaline—saline waters at 68° F., containing 33 grains per gallon of salts, mainly magnesium and calcium bicarbonate, and magnesium sulphate.

Therapeutic indications.—Rheumatism, gout, rheumatoid arthritis, neuritis, neurasthenia, catarrhs (bronchial, gastric, or enteric), anæmia, cardiac asthenia, chronic diseases of the liver or kidneys, digestive and biliary disorders.

Baths.—A complete modern installation exists for the administration of all kinds of baths, douches, packs, and other hydropathic treatment, electricity, massage, inhalations, Nauheim baths, with Swedish exercises.

Fango-di-Battaglia.—The volcanic mineral deposit from the hot springs near Padua (N. Italy) is imported, and extensively used in the treatment of gout, rheumatoid arthritis, and neuritis.

Matlock Bank (Matlock station, one mile by rail from Matlock Bath).—300 to 800 feet above sea level, 3½ hours from London. South-westerly aspect, and well sheltered from the north. Climate mildly bracing. Sunshine above the average. The Matlock system of hydropathic treatment is carried out in all its branches, and the principal Hydros are installed with latest electric baths and appliances, including high-frequency, Dowsing radiant heat and light. Schnee four-cell, x rays, etc. They also include Turkish, Russian, plunge, medicated and inhalation baths, Aix and Vichy douches.

Hydropathic Establishment.—Smedley's Hydropathic (See p. 627).

Peebles (Peebleshire, N.B.).—500 ft. above sea level. One hour from Edinburgh and 8 from London. Rainfall, 27 inches. Bracing climate, but sheltered from the north winds.

Waters.—The chief ingredient is chloride of sodium. They are obtained from the famous St. Ronan's Well (6 miles east).

Therapeutic indications.—The waters are specially suited to the Nauheim and Bourbon Lancy treatment of cardiac disease, dyspepsia, gout, rheumatism and neurasthenia.

Baths.—The baths at the hydropathic are of the most modern type. Complete electrical installation and mud baths (Fango-di-Battaglia).

Nursing Home.—St. Ronan's, Peebles. (See p. 618).

Ripon (Yorkshire).—120 feet above sea level. 4½ hours from London. Climate mild but bracing. Prevailing winds, W. and S.W.

Waters.—Saline sulphur water from Aldfield Spa, 4 miles distant.

Therapeutic indications.—Chronic and subacute gout, rheumatism, rheumatoid arthritis, chronic skin diseases (eczema, psoriasis, acne), catarrhs, gastric and liver derangements.

The Baths have been lately equipped with up-to-date electric apparatus.

Strathpeffer Spa (Ross-shire, N.B.).—180 to 300 feet above sea level. Sheltered from N. and N.E. winds. Prevailing wind S.W. Bracing air. Average rainfall 31 inches.

Waters.—Sulphurous and chalybeate. Sulphates, the predominating salt. Have strong diuretic and mild aperient action.

Therapeutic indications.—Chronic gout and rheumatism, rheumatoid arthritis, chronic skin diseases, chronic disorders of the digestive system, chronic gastric or intestinal catarrh, sluggish portal circulation, congested liver, biliary and urinary calculi, and neurasthenia.

Baths.—Sulphurous (immersion), inhalation, peat, douche (Aix and Vichy), needle, pine, Russian, Nauheim, radiant heat (electric), and high-frequency current.

Trefriw Wells (Carnarvonshire).—5 hours from London. The climate is bracing, the air soft, pure, and mostly of a westerly or south-westerly type.

Waters.—Two varieties: (1) The aluminous chalybeate, and (2) the sulpho-magnesian chalybeate. Used internally, and externally in the form of baths.

Therapeutic indications.—All those morbid conditions in which iron is indicated, and for the so-called 'metabolic' diseases, which chiefly consist in some digestive inefficiency, some incomplete elimination of food-toxins and other various waste products, and some defective blood-formation. Useful in certain chronic skin diseases, in chronic rheumatism, arthritis and neuritis.

Tunbridge Wells (Kent).—400 feet above sea level, 1 hour from London. Climate is tonic and invigorating. Prevailing winds W. and S.W.

Water.—A weak non-aerated, chalybeate spring, containing 4 grains ferrous carbonate to the gallon, with sulphates and chlorides of potash, soda, and calcium.

Therapeutic indications.—Waters indicated in anæmia, chlorosis and allied conditions.

Baths.—Immersion, douche, needle, Turkish, Russian, vapour and swimming, medicated and electric light.

Nursing.—Mount Ephraim Nursing Home (See p. 616).

Woodhall Spa (Lincolnshire) (See also p. 622).—50 feet above sea level. 3 hours from London. Average rainfall, 22½ inches. Air bracing, and uncontaminated, from moors and pine woods.

Waters.—Bromo-iodine waters, rich in the chlorides of sodium, calcium, and magnesium, with bromine and iodine.

Therapeutic indications.—Rheumatism (chronic articular and muscular), lumbago, arthritis deformans, gouty arthritis, sciatica, neuritis, paralysis, neurasthenia; injuries to joints; skin diseases, psoriasis, urticaria; diseases peculiar to women; diseases of throat and nose; liver disorders.

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Hotel.—Victoria Hotel (See p. 622).

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Birmingham Medical Review—Monthly 1/-; 10/- per annum—Percival Jones Lim., 148-149, Great Charles Street, Birmingham. (*See Advertisement.*)

Brain—Quarterly 4/—Macmillan & Co. Lim., St. Martin's Street, W.C.2.

Bristol Medico-Chirurgical Journal—Quarterly 1/6—Arrowsmith, Bristol. (*See Advertisement.*)

British Food Journal and Hygienic Review—Monthly 6d.—32, Shaftesbury Avenue, W.1.

British Journal of Surgery—Quarterly 8/6 net; 31/6 per annum—John Wright & Sons Ltd., Bristol.

British Medical Journal—Weekly 1/—429, Strand, W.C.2.

Burdett's Hospitals and Charities—Yearly 12/6—28-29, Southampton Street, W.C.2.

Caledonian Medical Journal—Quarterly 1/—70, Mitchell Street, Glasgow.

Cancer Research, Journal of—Quarterly, 23/- per annum—Cambridge University Press, Fetter Lane, E.C.4.

Charing Cross Hospital Gazette—Quarterly, 2/6 per annum—Charing Cross Hospital, Chandos Street, W.C.2.

Child, The—Monthly 2/—Bale, 83-91, Great Titchfield Street, W.1.

Children's Diseases, British Journal of—Monthly 2/-; 20/- per annum—Adlard & Son and West Newman, Bartholomew Close, E.C.1.

Clinical Journal—Monthly, 15/6 per annum—23, Bartholomew Close, E.C.1.

Dental Journal, British—1st and 15th, 1/—19, Hanover Square, W.1.

Dental Record—Monthly, 7/6 per annum—17, Newman Street, W.1.

Dental Science, British Journal of—Monthly 6d.; 14/- per annum—Bale, 83-91, Great Titchfield Street, W.1.

Dental Surgeon—Weekly 3d.; 13/- per annum—Baillière, 8, Henrietta Street, W.C.2.

Dentists' Register—Yearly 3/4—Constable, 10, Orange Street, W.C.2.

Dermatology, British Journal of—Quarterly, 25/- per annum—H. K. Lewis & Co. Lim., 136, Gower Street, W.C.1.

Dublin Journal of Medical Science—20/- per annum—Fannin & Co. Lim., 41, Grafton Street, Dublin.

Edinburgh Medical Journal—Monthly 2/—W. Green & Son Lim., Edinburgh.

Glasgow Medical Journal—Monthly 2/—A. Macdougall, Mitchell Street, Glasgow.

Guy's Hospital Gazette—Fortnightly 6d.; 7/6 per annum—Ash & Co. Lim., Henry Street, Bermondsey, S.E.1.

Guy's Hospital Reports—Yearly 10/6—7, Great Marlborough Street, W.1.

- Heart: A Journal for the Study of the Circulation—Quarterly, 20/- per annum—Shaw & Sons, 7, Fetter Lane, E.C.4
- Homœopathic Journal, British—Monthly 1/-—Bale, 83-91, Gt. Titchfield Street, W.1.
- Hospital—Weekly 2d.; 10/10 per annum—28, 29, Southampton Street, W.C.2. (*See Advertisement.*)
- Hygiene, Journal of—Quarterly, 8/6 each—Fetter Lane, E.C.4.
- Immunology, Journal of—Six times per annum 23/-—Cambridge University Press, Fetter Lane, E.C.4.
- Indian Medical Gazette—Monthly, 21/- per annum—Thacker & Co., 2, Creed Lane, E.C.4. (*See Advertisement.*)
- Inebriety, British Journal of—Quarterly 1/-—Bailliére, 8, Henrietta Street, W.C.2.
- Lancet—Weekly 10d.; 36/- per annum—423, Strand, W.C.2. (*See Advertisement.*)
- Laryngology, Rhinology, and Otology, Journal of—Monthly 2/-; 20/- per annum—Adlard & Son, 23, Bartholomew Close, E.C.1. (*See Advertisement.*)
- Laryngoscope, The—Monthly, 25/- per annum—Bailliére, 8, Henrietta Street, W.C.2.
- Liverpool Medico-Chirurgical Journal—Half-yearly, 2/6 each—H. K. Lewis & Co. Lim., 136, Gower Street, W.C.1.
- London Hospital Gazette—Monthly 8d.; 7/6 per annum—5, Rupert Street, E.
- Maternity and Child Welfare—Monthly 8d.; 7/6 per annum—Bale, 83-91, Great Titchfield Street, W.1.
- Medical Annual—Yearly 15/-—John Wright & Sons Lim., Bristol.
- Medical Directory—Yearly 24/-—Churchill, 7, Great Marlborough Street, W.1.
- Medical Magazine—Monthly 1/-; 10/6 per annum—44, Bedford Row, W.C.1.
- Medical Officer—Weekly 6d.; 21/- per annum—36-38, Whitefriars Street, E.C.4. (*See Advertisement.*)
- Medical Press and Circular—Weekly 6d.; 21/- per annum—Bailliére, 8, Henrietta Street, W.C.2. (*See Advertisement.*)
- Medical Register—Yearly 10/6—Constable, 10, Orange Street, W.C.2.
- Medical Review—Monthly 1/8—70, Finsbury Pavement, E.C.2.
- Medical Temperance Review—Quarterly 6d.—Adlard & Son and West Newman, 23, Bartholomew Close, E.C.1.
- Medical Times—Weekly 2d.; 10/6 per annum—49 & 50, Watling Street, E.C.4
- Medical World—Weekly 6d.—14, Gray's Inn Square, W.C.1.
- Medical and Dental Students' Register—Yearly 2/6—Constable, 10, Orange Street, W.C.2.
- Mental Science, Journal of—Quarterly 5/-—7, Great Marlborough Street, W.1.
- Microscopical Science, Quarterly Journal of—10/6—J. & A. Churchill, 7, Great Marlborough Street, W.1.
- Middlesex Hospital Journal—3/6 per annum—140, Wardour Street, W.1.
- Midland Medical Journal—Monthly 4d.; 3/6 per annum—Briars Hey, Stechford, Birmingham.
- Midwives' Roll—Yearly 15/-—Spottiswoode, 1, New Street Square, E.C.4.
- National Medical Journal—Monthly 3d.—346, Strand, W.C.2.
- Neurology and Psychiatry, Review of—30/- per annum—15, Frederick Street, Edinburgh.
- Obstetrics and Gynecology of the British Empire, Journal of—Monthly 2/6—Sherratt & Hughes, 33, Soho Square, W.1.
- Open-Air Schools and Children's Sanatoria, Year Book of—Yearly 7/6—Bale, 83-91, Great Titchfield Street, W.1.
- Ophthalmological Society's Transactions—Yearly 12/6—J. & A. Churchill, 7, Great Marlborough Street, W.1.
- Ophthalmology, British Journal of—Monthly, 42/- per annum—Pulman & Sons Lim., 24, Thayer Street, W.1.
- Parasitology—Quarterly, 35/- per annum—Cambridge University Press, Fetter Lane, E.C.4.
- Pathology and Bacteriology, Journal of—Quarterly, 21/- per annum—Pathological Laboratory, Museums, Cambridge.
- Pharmacology and Experimental Therapeutics, Journal of—six times per annum for 21/-—Cambridge University Press, Fetter Lane, E.C.4.
- Pharmacy, Year Book of—Yearly 10/-—7, Great Marlborough Street, W.1.
- Physiological Abstracts—Monthly, 25/- per annum—H. K. Lewis & Co. Lim., 136, Gower Street, W.C.1.
- Physiology (Experimental), Quarterly Journal of—25/- per annum—Chas. Griffin & Co. Lim., Exeter Street, W.C.2.
- Physiology, Journal of—Quarterly, 21/- per volume—Fetter Lane, E.C.4.
- Polyclinic—Monthly 6d.—Bale, 83-91, Great Titchfield Street, W.1.
- Practitioner—Monthly 4/-; 42/- per annum—2, Howard Street, Strand, W.C.2.
- Prescriber—Monthly 1/3; 12/6 per annum—6, South Charlotte Street, Edinburgh.
- Psychobiology—Six times per annum for 23/-—Cambridge University Press, Fetter Lane, E.C.4.

- Psychology, British Journal of—Quarterly, 15/—Cambridge University Press, Fetter Lane, E.C.4
- Psychology (Abnormal). Journal of—Bi-monthly, 25/- per annum—Baillière, 8, Henrietta Street, W.C.2.
- Public Health—Monthly 1/8—1, Upper Montague Street, W.C.1.
- Quarterly Journal of Medicine—Quarterly 8/6—Oxford University Press, Amen Corner, E.C.4.
- R.A.M.C., Journal of the—Monthly 2/—Bale, 83-91, Great Titchfield Street, W.1.
- Radiology and Electro-Therapy, Archives of—Monthly 3/—W. Heinemann Ltd., 20 Bedford Street, W.C.2.
- Röntgen Society, Journal of the—Quarterly 4/—Smith & Ebbs Lim., Northumberland Alley, Fenchurch Street, E.C.3.
- Royal Dental Hospital Reports—Quarterly, 5/- per annum—Bale, 83-91, Great Titchfield Street, W.1.
- Royal Naval Medical Service, Journal of the—Quarterly, 15/- per annum—83-91, Great Titchfield Street, W.1.
- Royal Sanitary Institute, Journal of the—Quarterly 3/—12, Long Acre, W.C.2.
- School Hygiene—Quarterly, 4/6 per annum—Adlard, 23, Bartholomew Close, E.C.1.
- South African Medical Record—Fortnightly 1/-; 21/- per annum—Baillière, 8, Henrietta Street, W.C.2.
- St. Bartholomew's Hospital Journal—Monthly 6d.—Students' Union, St. Bartholomew's Hospital, E.C.2.
- St. George's Hospital Gazette—Monthly 6d.—83-91, Great Titchfield Street, W.1.
- St. Mary's Hospital Gazette—Monthly, 5/- per annum—187, Edgware Road, W.2.
- St. Thomas's Hospital Gazette, Monthly, 5/- per annum—St. Thomas's Hospital, S.E.1.
- St. Thomas's Hospital Reports—Yearly 8/6—7, Great Marlborough Street, W.1.
- State Medicine, Journal of—Monthly, 2/—Bale, 83-91, Gt. Titchfield Street, W.1.
- Surgery, British Journal of—Quarterly, 8/6 net; 31/6 per annum—John Wright & Sons Lim., Bristol. (*See Advertisement.*)
- Surgery, Gynaecology, and Obstetrics, and International Abstract of Surgery—Monthly 5/-; 50/- per annum—Baillière, 8, Henrietta Street, W.C.2.
- Tropical Diseases Bulletin—Fortnightly 2/—Baillière, 8, Henrietta Street, W.C.2.
- Tropical Medicine and Hygiene, Journal of—Fortnightly 1/-; 18/- per annum—Bale, 83-91, Great Titchfield Street, W.1.
- Tropical Medicine and Hygiene, Year Book of—Yearly 7/6—Bale, 83-91, Great Titchfield Street, W.1.
- Tropical Medicine and Parasitology, Annals of—Quarterly, 22/6 per annum—University Press, 57, Ashton Street, Liverpool.
- Tuberculosis, British Journal of—Quarterly 1/6—Baillière, 8, Henrietta Street, W.C.2. (*See Advertisement.*)
- Tuberculosis Year Book and Sanatoria Annual—Yearly 7/6—Bale, 83-91, Great Titchfield Street, W.1.
- Universal Medical Record—Monthly, 25/- per annum—36-38, Whitefriars Street, E.C.4
- Urology, Journal of—Six times per annum for 23/—Cambridge University Press, Fetter Lane, E.C.4.
- West London Medical Journal—Quarterly 1/—23, Bartholomew Close, E.C.1.

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Grossmith, W. R., 12, Burleigh St., W.C.2
Pache & Son, 75, Station St., Birmingham

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Braid, A. E. & Co. Lim., 30, Gower Place,
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Liverpool
Grossmith, W. R., 12, Burleigh Street,
W.C.2
Haywood, J. H. Lim., Castle Gate,
Nottingham
Kenney Limb Co. Lim., 45, Bedford Row,
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Braid, A. E. & Co. Lim., 30, Gower Place,
Gower Street, W.C.1
Robinson & Sons Lim., Chesterfield

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Brand & Co. Lim., Mayfair Works,
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British Diamalt Co., Bishop's Stortford
Brown, Gore & Co., Tower House, 40,
Trinity Square, E.C.3 (Gautier Frères'
Brandy)
Cadbury Bros. Lim., Bournville, Birming-
ham
Callard & Co., 74, Regent Street, W.1
(Diabetic Foods)

Camwal Lim., 112, Pembroke Street, N. (Waters)
 Carnrick & Co. Lim., 183, Acton Vale, W.3
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 Davis & Davis, 20, Maddox Street, W.1 (Waters)
 Fry, J. S. & Sons Lim., Bristol & London
 Ingram & Royle Lim., 45, Belvedere Road, S.E.1
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 Valentine's Meat-Juice Co., Richmond, Virginia, U.S.A.

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Allen & Hanburys Lim., 37, Lombard Street, E.C.3
 Alliance Drug & Chemical Co., 34, Leadenhall Street, E.C.3
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 Bishop, Alfred, Lim., 48, Spelman St., E.1
 Boots Pure Drug Co. Lim., Nottingham
 Bristol-Myers Co., Brooklyn, New York
 Burroughs Wellcome & Co., Snow Hill Buildings, E.C.1
 Christy, Thos. & Co., 4, 10, & 12, Old Swan Lane, E.C.4
 Cook, Edwd. & Co. Lim., Bow, E.3
 Cowie, W. B. & Co. Lim., 26, Clyde Street, Edinburgh
 Denver Chemical Mfg. Co., 41, St. Ann's Road, Bow, London, E.3
 Duncan, Floekhart & Co., 155-157, Farringdon Road, E.C.1, and Edinburgh
 Evans Sons Lescher & Webb Lim., 60, Bartholomew Close, E.C.1, and 56, Hanover Street, Liverpool
 Fellows Company of New York, 26, Christopher Street, New York
 Ferris & Co. Lim., Bristol
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 Gale & Co. Lim., 15, Bouverie Street, E.C.4
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 Howards & Sons Lim., Ilford, N.E.
 Martindale, W., 10, New Cavendish Street, W.1
 Matthews, Harold E. & Co., 30, The Mall, Clifton, Bristol

Maw, S., Son & Sons Lim., 7-12, Aldersgate Street, E.C.1
 May, Roberts & Co. Lim., 7-13, Clerkenwell Road, E.C.1
 Menley & James Lim., Menley House, Farringdon Road, E.C.1
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 Midgley, Chas., Lim., 4, Exchange Street, Manchester
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 Willows, Francis, Butler & Thompson Lim., 40, Aldersgate Street, E.C.1
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 British Thomson-Houston Co., 77, Upper Thames Street, E.C.4
 Cavendish Electrical Co. Lim., 105-107, Great Portland Street, W.1
 Cox, Harry W. & Co. Lim., 159-161, Great Portland Street, W.1
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 Mottershead & Co., 7, Exchange Street, Manchester
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 Schall & Son, 71-75, New Cavendish Street, W.1
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 Thomson-Plaster Co., Leesburg, Va., U.S.A.

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bury Street, W.C.1
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Street, W.1
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W.1
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Covent Garden, W.C.2
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W.1
Baillière, Tindall & Cox, 8, Henrietta
Street, W.C.2
Bale, John Sons & Danielsson Lim., 83-91,
Great Titchfield Street, W.1
Black, A. & C., Lim., Soho Square, W.1
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Bar, W.C.2
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Fetter Lane, E.C.4
Cassell & Co. Lim., La Belle Sauvage,
Ludgate Hill, E.C.4 (and Printers)
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Street, W.1
Constable & Co. Lim., 10, Orange Street,
W.C.2
Cornish Bros. Lim., 39, New Street,
Birmingham
Faunin & Co. Lim., Grafton Street, Dublin
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mew Close, E.C.1
Methuen & Co. Lim., 36, Essex Street,
W.C.2
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Nisbet, Jas. & Co. Lim., 22, Berners
Street, W.1
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burgh
Oxford Medical Publications (Henry
Frowde and Hodder & Stoughton),
17, Warwick Square, E.C.4
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Milford), Amen Corner, E.C.
Pulman, Geo. & Sons Lim., Thayer Street,
W.
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W.C.2
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ampton Street, W.C.2
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Allen & Hanburys Lim., 48, Wigmore
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W.1
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Dental Manufacturing Co. Lim., Alston
House, Newman Street, W.1
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 Goodman, George Lim., Birmingham
 Grossmith, W. R., 12, Burleigh Street, W.C.2
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 Mayer & Phelps, 59 & 61, New Cavendish Street, W.1

Medical Supply Association, 167-185, Gray's Inn Road, W.C.1
 Millikin & Lawley, 165, Strand, W.C.2
 Montague, J. H., 69, New Bond Street, W.1
 Patent Pulp Mfg. Co. Lim., 38, York Road, King's Cross, N.1 ("Red Cross" Bowls and Basins)
 Reynolds & Branson Lim., 13, Briggate, Leeds
 Salmon Ody Lim., 7, New Oxford Street, W.C.1 (Trusses)
 Siebe Gorman & Co. Lim., 187, Westminster Bridge Road, S.E.
 Sumner, R. & Co. Lim., 40, Hanover Street, Liverpool
 Surgical Manufacturing Co., 83-85, Mortimer Street, W.1
 Terry, Herbert & Sons Lim., Redditch (Spring Exercisers)
 Weiss, John & Son Lim., 287, Oxford Street, W.1
 Woolley, Jas. Sons & Co. Lim., Victoria Bridge, Manchester

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Government Lymph Establishment, at Colindale Avenue, The Hyde, N.W.9.
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NOTE BOOK.

It is easier to make a note of a thing than to remember *where* the note was made. The following pages are indexed under their respective headings, and any note can be immediately found when required.

1919

JANUARY.	
5	* 5121926
M	* 6132027
Tu	* 7142128
W	1 8152229
Th	2 9162330
F	310172431
S	4111825 *

NOTES.

Copy here any formula or fact you wish to keep for reference.
(These pages are indexed under the word "Notes.")

1919

FEBRUARY.	
5	* 2 91623 *
M	* 3101724 *
Tu	* 4111825 *
W	* 5121926 *
Th	* 6132027 *
F	* 7142128 *
S	1 81522 *

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Signed.....M. D.

1919

MARCH.	
S	* 2 9162330
M	* 310172431
Th	* 4111825 *
W	* 5121926 *
Th	* 6132037 *
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S	1 8152239 *

NOTES.

1919

APRIL.	
S	* 6142037
M	* 7142128
Th	1 8152239
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Th	3101724 *
F	4111825 *
S	5121926 *

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1919

MAY.	
S	411 18 25
M	612 19 26
Tu	613 20 27
W	714 21 28
Th	1 815 22 29
F	2 916 23 30
S	3 1017 24 31

NOTES.

1919

JUNE.	
S	1 815 23 29
M	2 916 24 30
Tu	3 1017 24 *
W	4 1118 25 *
Th	5 1219 26 *
F	6 1320 27 *
S	7 1421 28 *

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See Advertisement, page lxxx.

1919

JULY.	
S	* 6 13 20 27
M	* 7 14 21 28
Tu	1 8 15 22 29
W	2 9 16 23 30
Th	3 10 17 24 31
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1919

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Tu	* 5 12 19 26 *
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Th	* 7 14 21 28 *
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S	" 7142128
M	1 8152229
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Th	4 111825 *
F	5 121926 *
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Note whether Midwifery or Sick Nurses,
their terms and addresses.

1919

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S	" 5121926 *
M	" 6132027 *
Tu	" 7142128 *
W	1 8152229 *
Th	2 9162330 *
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1919

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M	* 31017 34 *
Tu	* 411 18 25 *
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TITLE, ETC., OF OFFICE.	A	B	C	D	E
Abstainers and General Insurance Co., Ltd., Edmund St., Birmingham. <i>Gen. Manager,</i> H. J. Greening .. P	1883	40/11	55/10	82/3	£ 1,082,346
Alliance Assurance Co., Ltd., Bartholomew Lane, E.C. <i>Gen. Man.,</i> O. Morgan Owen P	1824	48/9	64/5	90/9	17,946,531
Atlas Assurance Co., Ltd., 92, Cheapside, E.C. <i>Gen. Man.,</i> C. H. Fallson. <i>Act.,</i> William Penman .. P	1808	49/3	63/7	88/8	2,474,867
Australian Mutual Provident Society. Life, Endowments and Annuities, 37, Threadneedle Street, E.C. <i>Manager</i> for U.K., W. C. Fisher. Further particulars see page 565 .. M	1849	48/2	64/5	89/10	38,000,000
Britannic Assurance Co. Ltd., Life, En- dowment Assurances. House Purchase, Broad Street Corner, Birmingham. <i>Chair-</i> <i>man,</i> F. T. Jefferson, J.P. <i>Secretary,</i> J. M. Laing, F.I.A. Further particulars see page 567 .. P	1866	47/9	64/-	91/1	4,430,236
British Equitable Assurance Co. Ltd., 1, 2, 3, Queen Street Place, E.C. <i>Manager,</i> Basil May, F.I.A. .. P	1854	48/8	64/11	91/9	*1,620,000
Caledonian Insurance Co., 19, George Street, Edinburgh. <i>Gen. Man.,</i> R. Hill Stewart, F.F.A. London Offices, 82, King William St., E.C., and 14, Waterloo Place, S.W. P	1805	48/9	64/6	88/6	3,476,938
Canada Life Assurance Co., 15, King Street, Cheapside, E.C. <i>Man.,</i> A. D. Cheyne P	1847	48/5	65/4	94/2	12,387,227
Century Insurance Co. Ltd., 18, Charlotte Sq., Edinburgh. <i>Man. Dir.,</i> Hy. Brown. <i>Sec.,</i> John R. Little. London Office, 27, Queen Victoria St., E.C.4. <i>Man.,</i> S. G. Pasfield	1885	50/-	65/4	91/-	1,062,582
City Life Assurance Co. Ltd., 6, Paul Street, Finsbury, E.C. <i>Gen. Man.,</i> D. Bailey	1897	44/1	60/11	89/7	649,631
Clergy Mutual Assurance Society, Life, 2 & 3, Sanctuary, Westminster. <i>Act. and Man.,</i> P. B. Wyatt. <i>Sec.,</i> F. T. M. Byers .. P	1829	46/4	62/2	87/4	4,350,892
Clerical, Medical, and General Life Assurance Society, 15, St. James's Square, S.W., and 1, King William Street, E.C. <i>Gen. Man. &</i> <i>Act.,</i> A. D. Besant .. P	1824	48/7	66/6	95/6	6,312,720
Colonial Mutual Life Assurance Society Ltd., 33, Poultry, E.C. <i>Man.,</i> Arthur E. Gibbs. <i>Assist. Man.,</i> H. A. Cawdon .. M	1873	48/9	65/1	89/10	4,369,960
Commercial Union Assurance Co. Ltd., 24, 25, and 26, Cornhill, E.C. <i>Act.,</i> A. G. Allen P	1861	47/10	65/2	92/4	*7,104,345
Co-operative Insurance Society Ltd., 109, Corporation Street, Manchester. <i>Man.,</i> James Odgers. Further particulars see page 566 .. P	1867	47/4	63/1	90/1	900,000
Eagle Star and British Dominions Insurance Co. Ltd. Head Office, British Dominion House, Royal Exchange Avenue, E.C. 3 Life Dept., 32, Moorgate St., E.C.2 <i>Man.</i> <i>Dir.,</i> Sir Edward M. Mountain .. P	1807	47/9	63/6	89/8	About 10,000,000
Edinburgh Life Assurance Co., 26, George Street, Edinburgh. <i>Man.,</i> T. M. Gardiner. <i>Sec. & Act.,</i> A. E. Sprague, D.Sc., F.F.A., F.I.A. London, 3, Birch Lane, E.C. <i>Sec.,</i> J. J. Bisgood .. P	1823	47/11	64/2	90/2	4,232,201
Equitable Life Assurance Society, Mansion House Street, E.C.2. <i>Act. & Man.,</i> W. Paln Elderton, F.I.A., .. M	1762	53/5	67/11	90/7	4,865,954

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Equity and Law Life Assurance Society, 18, Lincoln's Inn Fields, W.C. <i>Act. & Sec.</i> , W. P. Phelps, M.A., F.I.A. P	1844	48/10	64/6	90/9	£ 5,050,927
Friends' Provident Institution, Bradford, Yorkshire. <i>Gen. Man. & Sec.</i> , Henry J. Tapscott. <i>Act.</i> , Alfred Moorhouse, F.I.A. M	1832	48/-	64/-	89/7	3,315,642
General Accident Fire and Life Assurance Corporation Ltd., Perth, Scotland. <i>Gen. Man.</i> , F. Norie-Miller, J.P. P	1885	49/2	64/11	91/3	239,627
General Life Assurance Co., 103, Cannon Street, E.C. 4. <i>Assist. Sec.</i> , Albert Burton Nye. Further particulars see page 564 P	1837	49/10	65/4	92/8	2,061,489
Gresham Life Assurance Society Ltd., St. Mildred's House, Poultry, E.C. 2. <i>Man. & Sec.</i> , Alexander Lawson P	1848	47/6	62/10	88/6	9,617,720
Guardian Assurance Co. Ltd., 11, Lombard Street, and 21, Fleet St., E.C. <i>Gen. Man.</i> , Geo. W. Reynolds. <i>Act.</i> , Ernest Woods P	1821	48/10	64/6	89/3	4,457,296
Law Union and Rock Insurance Co. Ltd., Old Serjeants Inn, Chancery Lane. <i>Gen. Man.</i> , R. Stirling. P	1806	48/4	64/-	89/10	*2,215,545
Legal & General Life Assurance Society, 10, Fleet St., E.C. <i>Act. & Man.</i> , E. Colquhoun F	1836	50/9	65/11	90/9	*10,983,090
Life Association of Scotland, 82, Princes St., Edinburgh. <i>Man.</i> , Gordon Douglas. <i>Sec.</i> , R. M. M. Roddick. London Office, 28, Bishopsgate, E.C. <i>Sec.</i> , J. C. Wardrop P	1838	48/11	64/10	91/1	5,712,780
Liverpool and London and Globe Insurance Co. Ltd., 1, Dale Street, Liverpool. <i>Gen. Man. & Sec.</i> , A. G. Dent. London Office, 1, Cornhill, E.C. P	1836	49/10	65/9	91/3	4,930,672
London and Lancashire Life and General Assurance Association Ltd., 66, 67, Cornhill, E.C. <i>Gen. Man.</i> , W. Aneas Mackay. <i>Sec.</i> , Louis I. Jarvis. <i>Int. Asst. Sec.</i> , E. E. Dent and I. C. Kestlin. <i>Act.</i> , Harold Dougherty P	1862	48/9	64/9	91/2	*3,949,438
London Assurance Corporation, 7, Royal Exchange, E.C. <i>Man. of Life Dept.</i> , James Clunes. <i>Act.</i> , A. G. Henning P	1720	49/-	64/8	90/2	2,700,722
London Life Association, Ltd., 81, King William Street, E.C. <i>Act. & Man.</i> , H. M. Trouncer, M.A., F.I.A. M	1806	47/-	61/8	85/4	5,582,221
Marine and General Mutual Life Assurance Society, 14, Leadenhall Street, E.C. <i>Act. & Sec.</i> , S. Day, F.I.A. M	1852	48/10	65/-	91/6	*2,181,090
Metropolitan Life Assurance Society, 13, Moor-gate Street, E.C. 2. <i>Act. & Man.</i> , H. J. Baker, F.I.A. M	1835	49/9	66/4	92/-	2,287,093
Mutual Life and Citizens' Assurance Co. Ltd. (of Australia), Effingham Ho., 1, Arundel St. W.C. <i>Sec.</i> , Alex. S. Sellar, M.A., F.F.A. P	1886	48/9	65/3	89/9	10,777,000
Mutual Life Insurance Co. of New York, 7 & 8, Norfolk Street, Strand, W.C. 2. <i>Gen. Man.</i> , J. H. Harrison Hogge. <i>Sec.</i> , L. A. Mumford M	1843	48/9	66/-	97/-	127,619,656
National Benefit Assurance Co. Ltd., National House, Newgate Street, E.C. <i>Man.</i> , J. Francis, J.P., F.S.S. <i>Sec.</i> , S. F. Gaudell. Further particulars see page 566 P	1890	46/4	61/7	87/4	28,519
National Mutual Life Assurance Society, 39, King Street, Cheapside, E.C. <i>Act. & Man.</i> , G. Marks, O.B.E., F.I.A. <i>Sec.</i> , H. J. Lockwood. <i>Asst. Act.</i> , E. W. Townley, F.I.A. M	1830	48/4	63/7	89/6	3,081,427
National Mutual Life Association of Australasia Ltd., 5, Cheapside, E.C. <i>Man.</i> , H. W. Meyers M	1869	46/8	61/6	87/2	10,800,000
National Provident Institution, 48, Gracechurch Street, E.C. <i>Act. & Sec.</i> , L. F. Howl M	1835	50/2	66/3	91/1	7,247,407

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New York Life Insurance Co., Trafalgar Buildings, Trafalgar Square, London, W.C. <i>Gen. Man.</i> , E. H. Krause. <i>Sec.</i> , Wm. R. Collin-on, F.C.I.S. M	1845	48/9	66/-	96/11	£ 192,620,821
North British and Mercantile Insurance Co., 61, Threadneedle St., E.C. 2, & 64, Princes St., Edinburgh. <i>Gen. Man.</i> , London, A. Worley. <i>Life Man.</i> , London, D. C. Halderman. <i>Gen. Man.</i> , Edin., Owen D. Jones P	1809	49/10	66/1	91/11	*17,275,302
Northern Assurance Co. Ltd, 1, Moorgate Street, E.C. <i>Joint Gen. Managers</i> , H. Gayford, J. Robertson P	1836	49/-	64/8	90/10	5,007,695
Norwich Union Life Insurance Society, Norwich. <i>Gen. Man. & Act.</i> , Davidson Walker. London Office, 49, Fleet Street, E.C. P	1808	45/8	59/6	85/3	15,399,420
Pearl Assurance Co. Ltd., High Holborn, W.C. <i>Man'g Director</i> , G. Shrubbsall, J.P. P	1864	49/-	65/-	92/-	11,676,831
Phoenix Assurance Co. Ltd., Phoenix House, King William St., E.C. 4, Trafalgar Ho se, Waterloo Place, S.W. 1, & 187, Fleet Street, E.C. 4. <i>Gen. Man.</i> , Sir Gerald H. Ryan, F.I.A. P	1782	48/11	64/7	90/8	*11,178,995
Provident Mutual Life Assurance Association, 27 & 29, Moorgate Street, E.C. <i>Man. & Act.</i> , C. R. V. Coutts M	1840	46/4	62/8	92/2	2,815,857
Prudential Assurance Co. Ltd., Holborn Bars. <i>Sec.</i> , Sir George May, K.B.E. Further particulars see page 565 P	1848	49/6	65/11	91/11	49,349,826
Refuge Assurance Co. Ltd., Oxford Street, Manchester. <i>Gen. Mans.</i> , J. Proctor Green and W. H. Aldcroft. London Office, 133, Strand, W.C. P	1864	49/3	65/9	91/9	14,468,113
Royal Exchange Assurance Corporation, Royal Exchange, E.C. and 44, Pall Mall, S.W. <i>Act.</i> , H. E. Nightingale, F.I.A. .. P	1720	49/-	64/9	90/2	4,829,342
Royal Insurance Co. Ltd., 1, North John St., Liverpool. <i>Gen. Man.</i> , G. Chappell. London Offices, 24-28, Lombard Street. <i>Sec.</i> to London Board, R. McConnell .. P	1845	48/8	64/4	90/4	12,175,481
Scottish Amicable Life Assurance Society, St. Vincent Place, Glasgow. <i>Gen. Man.</i> , W. Hutton. <i>Sec.</i> , C. Guthrie. London Office, 1, Threadneedle St., E.C. <i>Sec.</i> H. Robertson M	1826	51/9	66/3	90/1	6,273,551
Scottish Equitable Life Assurance Society, 28, St. Andrew Square, Edinburgh. <i>Man. & Act.</i> , G. M. Low. <i>Sec.</i> , J. J. McLauchlan. London Office, 14, Cornhill, E.C. 3. <i>Sec.</i> , P. W. Purves M	1831	50/-	65/5	90/6	5,875,613
Scottish Life Assurance Co. Ltd., 19, St. Andrew Square, Edinburgh. <i>Man.</i> , Lewis P. Orr, F.R.S.E. London Office, 9 & 10, King St., E.C. <i>Sec.</i> , L. Campbell .. P	1881	49/5	64/6	90/5	2,466,880
Scottish Provident Institution, 6, St. Andrew Square, Edinburgh. <i>Man.</i> , J. G. Watson. <i>Sec.</i> , R. T. Boothby. <i>Joint Asst. Secs.</i> , C. W. Thomson & Jas. C. Lindsay. <i>Act.</i> , W. G. Walton. London Offices, 3, Lombard St. E.C., and 17, Pall Mall, S.W. M	1837	42/4	56/6	83/2	16,129,000
Scottish Temperance Life & Accident Insurance Co., Ltd., 109, St. Vincent Street, Glasgow. <i>Manager</i> , Adam K. Rodger. London, 2, 3 & 4, Cheapside. <i>Man.</i> , R. J. Moss. Less 10 per cent to Whole Life Abstiners P	1883	48/6	63/9	89/10	2,566,288
Scottish Union & National Insurance Co., 35, St. Andrew Square, Edinburgh. <i>Gen. Man.</i> , J. A. Cook. London Office, 5, Walbrook, E.C. 4. <i>Sec.</i> , James G. Nicoll P	1824	48/9	64/6	89/6	8,159,718

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Scottish Widows' Fund Life Assurance Society, 9, St. Andrew Square, Edinburgh. <i>Man. & Act.</i> , G. J. Liddstone. <i>Sec.</i> , Geo. C. Stenhouse. London Offices, 28, Cornhill, E.C., and 17, Waterloo Place, S.W. M	1815	51/9	66/3	90/7	*22,444,824
Standard Life Assurance Co., 3, George Street, Edinburgh. <i>Man. & Sec.</i> , Leonard W. Dickson. London Offices, 83, King William St., <i>Sec.</i> , C. F. Fox, and 3, Pall Mall East, <i>Sec.</i> , F. M. Willats P	1825	48/11	64/5	89/-	13,660,000
Star Assurance Society, 32, Moorgate Street, E.C. <i>Gen. Man.</i> , J. Douglas Watson. P	1843	49/9	66/3	93/8	*7,029,216
Sun Life Assurance Society, 63, Threadneedle Street, E.C. <i>Sec. & Gen. Man.</i> , E. Linnell. <i>Act.</i> , R. G. Salmon, F.I.A. Assistant <i>Sec.</i> , G. M. Searle, F.I.A. P	1810	49/2	66/6	94/2	11,488,908
Sun Life Assurance Co. of Canada, Canada House, 4 & 5, Norfolk Street, W.C. <i>Man.</i> , J. F. Junkin. P	1865	48/5	65/4	94/1	*15,019,395
United Kingdom Provident Institution, 196, Strand, W.C. <i>Sec.</i> , H. W. Hasler M	1840	49/6	65/-	91/10	10,312,389
University Life Assurance Society, 25, Pall Mall, S.W.1. <i>Act. & Sec.</i> , R. Todhunter, M.A. P	1825	49/11	65/4	91/5	886,027
Wesleyan & General Assurance Society, Life, Annuities, Sickness, Assurance Buildings, Steelhouse Lane, Birmingham. <i>Gen. Man.</i> , A. L. Hunt. London Office, Halton House, 20-23, Holborn, E.C. Further particulars see page 564 M	1841	48/1	65/8	93/10	3,108,490
Yorkshire Insurance Company, Ltd., Chief Offices: St. Helen's Square, York. Bank Buildings, Princes Street. E.C. London Branches, 48, Pall Mall, S.W.; 49, Sloane Square, S.W.; 222-225, Strand, W.C.; 132, Newington Crescent, S.E.; 43, Broadway, Stratford, S.E.; 551, High Road, Tottenham, N. Further particulars see page 558 P	1824	49/1	64/9	91/7	2,796,827

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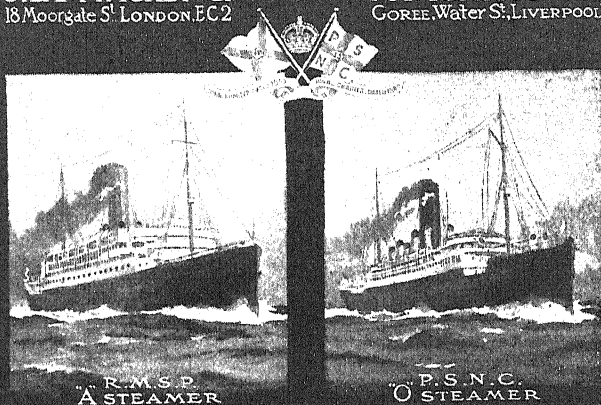
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- SWEDISH REMEDIAL EXERCISES JULY and DEC.
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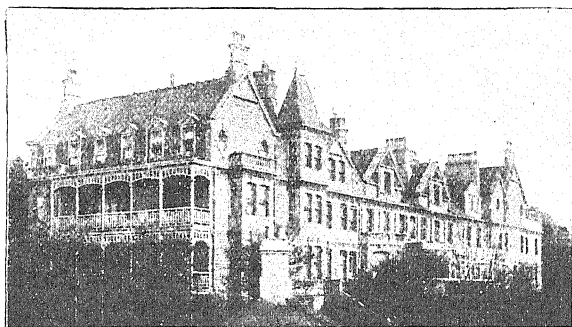
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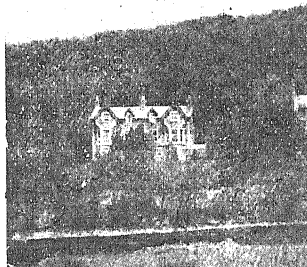
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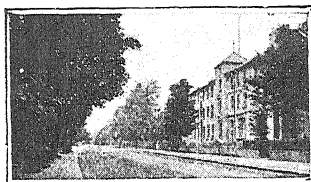
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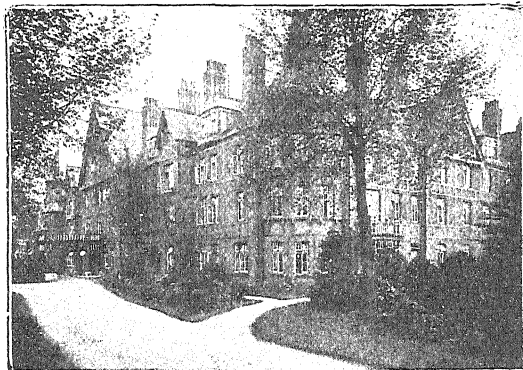


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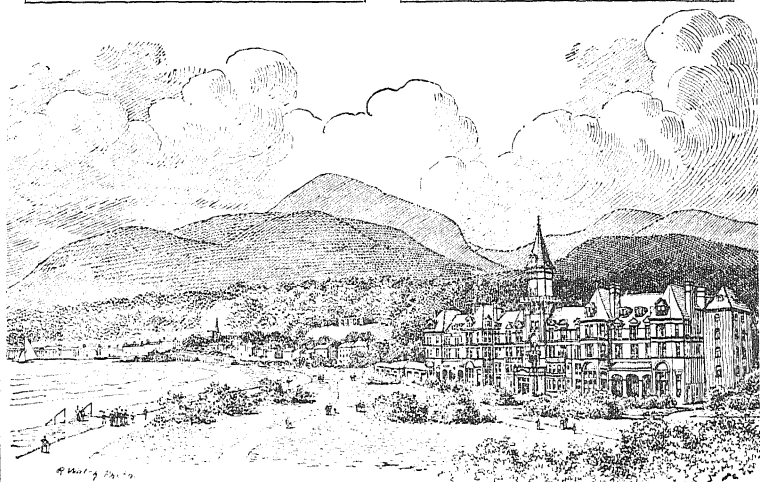
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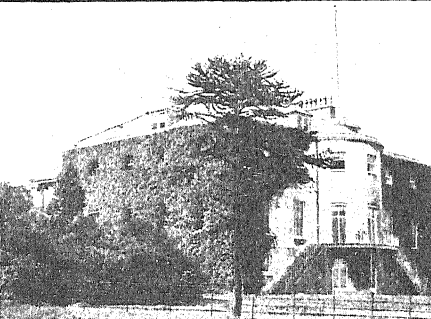
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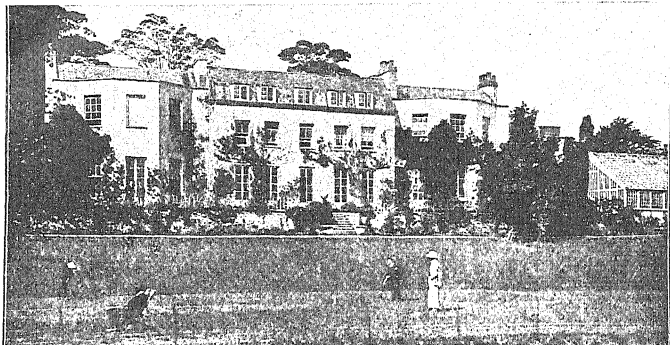
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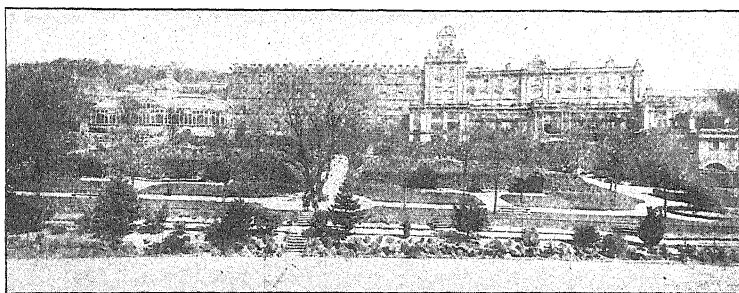
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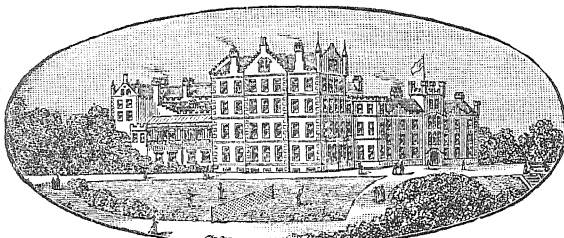
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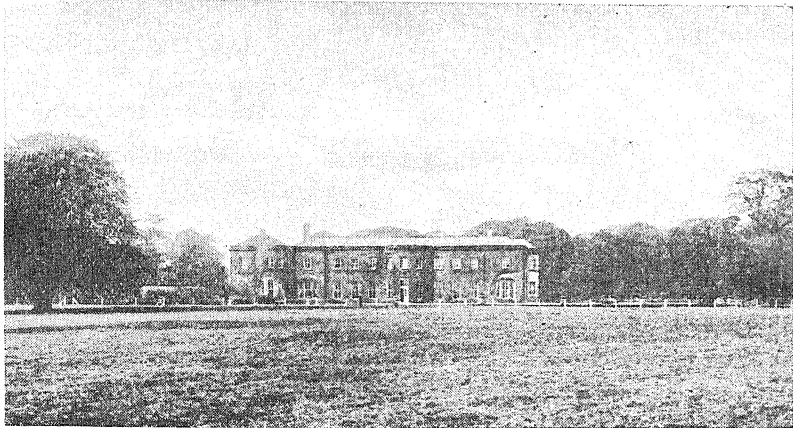
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Haydock Lodge has also associated with it Establishments at **GRETA BANK** (for Ladies only), in the Graven district of **YORKSHIRE**, near **INGLETON**, and **OVERDALE**, near **MANCHESTER**, under the management of **P. G. MOULD, L.R.C.P., M.R.C.S.**, late A.M.O. at Cheshire Royal Asylum.

Information as to Terms, etc., may be obtained from the—
Resident Medical Proprietor: **CHARLES T. STREET, L.R.C.P. Lond., M.R.C.S. Eng.** : or the
Resident Medical Licensee and Superintendent: **J. C. WOOTTON, L.R.C.P. Lond., M.R.C.S. Eng.**

Visiting Physicians.....

{	SIR JAMES BARR, M.D., 72 Rodney Street, Liverpool, <i>Physician to the Liverpool Royal Infirmary, etc.</i>
	W. B. WARRINGTON, M.D., 63 Rodney Street, Liverpool, <i>Physician to the Northern Hospital (Liverpool).</i>
	G. E. MOULD, L.R.C.P. Lond., M.R.C.S. Eng., The Grange, near Rotherham, <i>Physician for Mental Diseases to the Sheffield Royal Hospital.</i>

DR. STREET or **DR. WOOTTON** attends at 47 Rodney St., Liverpool, every Thursday, from 2 to 4.
Telephone: "Royal 2556."

DR. MOULD at Winter's Buildings, St. Ann's St., Manchester, Tuesday and Thursday, 12.30 to 1.30.

BETHLEM ROYAL HOSPITAL,

Lambeth Road, LONDON, S.E. 1

For the Reception and Treatment of Cases of Nervous and Mental Disease.

President—ALDERMAN COL. SIR CHARLES CHEERS WAKEFIELD

Treasurer—LIEUT.-COL. ALFRED JAMES COPELAND, F.S.A.

Physician Superintendent—J. G. PORTER PHILLIPS, M.D., M.R.C.P.

Assistant Physician—H. LESLIE MCCARTHY, M.D. *Pathologist*—CLEMENT LOVELL, M.D.

CONSULTING STAFF.

Surgeon—Arthur Evans, Esq., M.S., F.R.C.S.

Gynaecologist—Thomas George Stevens, Esq.,

M.D., F.R.C.S.

Ophthalmologist—J. Francis Cunningham, Esq.,

F.R.C.S.

Laryngologist, etc.—W. Mayhew Mollison, Esq., F.R.C.S.

Anæsthetist—Cecil M. Hughes, Esq., M.B., B.S.

Dentist—Fredk. Todd, Esq., M.R.C.S., L.D.S.

PATIENTS of the Educated Classes, in a presumably Curable condition, are alone eligible for Admission, and may be received either Free, or on payment of a fixed inclusive rate of 2 guineas per week. With a view to the early treatment of Eligible cases Voluntary or Uncertified Patients are admitted.

The following are NOT eligible :

1. Those who have been Insane more than twelve months, and are considered by the Medical Superintendent to be incurable.
2. Those who are in a state of Idiocy, or subject to Epileptic Fits.
3. Those whose condition either threatens speedy dissolution of life or requires the permanent and exclusive attention of a nurse.

In connection with this Hospital, there is a **CONVALESCENT HOME** on the Surrey Hills at **WITLEY**.

For Forms or further particulars, apply to the Physician Superintendent,

J. G. PORTER PHILLIPS, M.D., M.R.C.P.

THE COPPICE, NOTTINGHAM.

Hospital for Mental Diseases.

President : The Right Hon. EARL MANVERS.

THIS Institution for the reception of **PRIVATE PATIENTS** of both sexes of the **Upper and Middle Classes** only, at moderate rates of payment, is beautifully situated in its own grounds about two miles from Nottingham, and from its singularly healthy and pleasant position, and the comfort of its internal arrangements, affords every facility for the **Relief and Cure of those Mentally Afflicted**. Divine Service is held in the Institution every Sunday by the Chaplain, who also visits the Patients. Carriage and motor exercise is provided.

— FOR TERMS, ETC., APPLY TO —

DR. HUNTER, Physician-Superintendent.

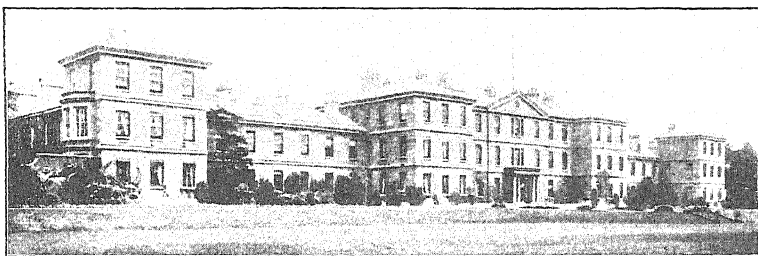
St. ANDREW'S HOSPITAL

FOR MENTAL DISEASES,

NORTHAMPTON.

FOR THE UPPER and MIDDLE CLASSES ONLY.

President—THE RIGHT HON. THE EARL SPENCER, K.G.



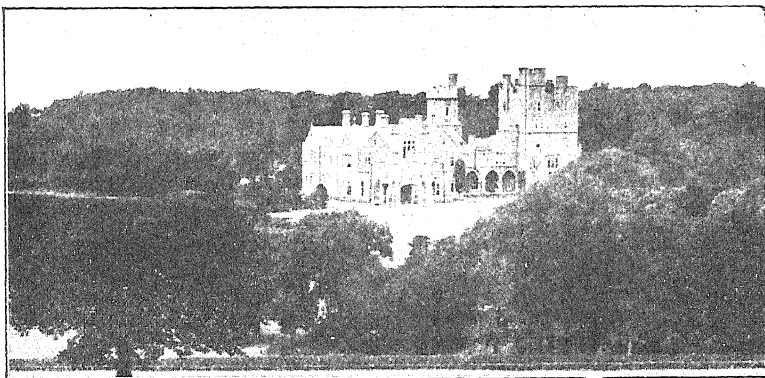
THIS Registered Hospital is pleasantly situated in 118 acres of park and pleasure grounds. Every facility is provided for cricket, football, hockey, croquet, lawn-tennis, bowls, golf, motoring, boating, and gardening. Voluntary Boarders as well as Certified Patients of both Sexes are received for treatment. PRIVATE ROOMS with Special Attendants, in the Hospital or in Villas in the Grounds, can be arranged.

The Hospital has a BRANCH ESTABLISHMENT at

MOULTON PARK,

Two miles from the Hospital, where there is a farm of 473 acres, which supplies the Hospital with meat, milk, and other farm produce.

BRYN-Y-NEUADD HALL, LLANFAIRFECHAN.



THE SEASIDE HOUSE OF ST. ANDREW'S HOSPITAL, is beautifully situated in a Park of 331 acres, close to the Sea, and in the midst of the finest scenery in North Wales. Patients can enjoy good cricket, lawn-tennis, croquet, golf, trout-fishing, and bathing. Patients or Boarders may visit this Branch for long or short periods, and can have Private Rooms in Villas in the Park.

For Terms and further particulars apply to the MEDICAL SUPERINTENDENT,
ST. ANDREW'S HOSPITAL, NORTHAMPTON. Telephone No. 56.

For the Treatment of Mental Diseases.

SHAFTESBURY HOUSE,

FORMBY-BY-THE-SEA,

Telephone: No. 8 FORMBY.

Near LIVERPOOL.

THIS HOUSE, specially built and licensed for the **Care and Treatment of a limited number of Ladies and Gentlemen Mentally afflicted**, is delightfully situated near the coast between Liverpool and Southport, so that patients have the benefit of pure bracing sea air, for which Formby is noted. The House is in the country, and stands in several acres of ornamental well-wooded grounds, the surroundings being in every way bright, cheerful and pleasant. All kinds of outdoor and indoor amusements and occupation provided. Voluntary Boarders without certificates admitted.

— *TERMS MODERATE* —
Apply *MEDICAL SUPERINTENDENT.*

Dr. STANLEY GILL and Dr. HAYES GILL may be consulted by appointment at **31 RODNEY STREET, LIVERPOOL**, from 2 till 4 p.m. every Monday and Thursday.

BOREATTON PARK

THIS PRIVATE ASYLUM, which was founded by the late **W. H. O. SANKEY, M.D., F.R.C.P.**, for the reception of a limited number of

LADIES & GENTLEMEN MENTALLY AFFLICTED,

— is now conducted by his son, —
E. H. O. SANKEY, M.A., M.B., B.C. Cantab.

The Ladies' Division is directly supervised by **Mrs. SANKEY.**

The Mansion stands high, among handsomely laid out gardens in the midst of a picturesque deer park (about 40 head of deer are kept), and commands a magnificent view of Welsh mountain scenery.

Carriages, horses, motor, lawn-tennis, golf, trout and other fishing are provided.

Arrangements can be made to enable friends of patients to reside in the House as Boarders if so desired.

The Asylum is situate about ten miles from Shrewsbury, within easy distance of Baschurch Station, G.W.R., whither carriages can be sent at any time for visitors.

Letters and Telegrams should be addressed to—

Dr. SANKEY, Boreatton Park, Baschurch, SALOP.

STRETTON HOUSE,

CHURCH STRETTON, SHROPSHIRE.

A Private Licensed House for the treatment of Gentlemen suffering from Nervous or Mental Diseases.

ESTABLISHED 1853.

SITUATED amongst charming scenery, more than 600 feet above the sea, large grounds, pure water, perfect sanitation, and enjoying the bracing air of the "English Highlands."

Easily accessible from all parts. Good train services on G.W. and L. & N.W. Railways.

Congenial occupation and recreation are specially attended to, and all sorts of indoor and outdoor amusements are provided.

Patients have carriage exercise and daily walks amongst the beautiful mountain scenery.

For Terms and further information, apply to—

THE MEDICAL SUPERINTENDENT.

Telegrams: "Stretton House, Church Stretton."



Telephone: 10, Church Stretton.

KINGSDOWN HOUSE,

BOX (Near BATH).

Telephone: No. 2 Box.

LICENSED FOR THE TREATMENT OF DISEASES OF THE BRAIN AND NERVOUS SYSTEM.

THIS House is situate 450 feet above sea level, and commands extensive views of the surrounding country.

Access—Box Station (G.W.R.); Bath Stations (Midland and G.W.R.) twenty minutes from the house.

For terms apply to—

Dr. H. C. MacBRYAN, Resident Proprietor & Medical Superintendent,
at the above,

Or at 17, BELMONT, BATH.

Telephone: No. 636, BATH.

New Saughton Hall, POLTON, MIDLOTHIAN.

The only Private Hospital for the Treatment of Mental Cases in Scotland.



NEW SAUGHTON HALL, which takes the place of Saughton Hall, established in 1798, is situated seven miles south of Edinburgh, in the beautiful neighbourhood of Hawthornden, and Rosslyn, and is surrounded by picturesque and well-timbered pleasure grounds extending to 125 acres. There is also a **SEASIDE HOUSE** at **GULLANE, EAST LOTHIAN**.

RAILWAY STATIONS.—Polton five minutes; and Loanhead, ten minutes' walk from the Institution—reached in half-an-hour from the Waverley Station, Edinburgh. Telephone: 4 Loanhead. Forms of Admission for Voluntary or Certified Cases, full instructions, etc., can be obtained on application to the Resident Medical Superintendent, **J. BATTY TUKE, M.D., F.R.C.P. Ed.**

Inclusive Terms from £126 to £400 per annum, according to requirements.

BETHEL HOSPITAL FOR MENTAL DISEASES, ESTABLISHED A.D. 1713. NORWICH.

THIS INSTITUTION is an endowed Hospital, registered under the Lunacy Acts, and managed by a Board of Governors who have no pecuniary interest in its success, but whose sole object is to promote the comfort and well-being of the Patients. The Hospital is arranged for both sexes.

The Terms for admission are **Thirty-five Shillings per Week, or more**, according to Patients' condition and circumstances, which includes everything, except clothing, carriage exercise, or any expenses incurred for amusement beyond the Hospital grounds.

CONSULTING PHYSICIAN:

SAMUEL J. BARTON, M.D.

RESIDENT MEDICAL SUPERINTENDENT:

SAVILLE J. FIELDING, M.B.

CLERK TO THE GOVERNORS:

FRANCIS HORNOR, QUEEN STREET, NORWICH.

MATRON: Miss OXLEY.

APPLICATION FOR ADMISSION TO BE MADE TO THE
Resident Medical Superintendent, BETHEL HOSPITAL, NORWICH.

THE WARNEFORD

HEADINGTON HILL, OXFORD.

A Registered Hospital for the Care & Treatment of both Sexes of the Upper and Middle Classes, when suffering from Nervous and Mental Disorders. . .

President—THE RIGHT HON. THE EARL OF JERSEY.

Chairman of the Committee—REV. WM. ARCHIBALD SPOONER, D.D.,
Warden of New College, Oxford.

Vice-Chairman—

SURGEON-GENERAL SIR A. FREDERICK BRADSHAW, M.A., K.C.B.

The Regular Charge for Patients is £2 12s. 6d. a week, but the Committee have power to alter the charges at their discretion, as the circumstances of cases require.

The building is arranged, so far as is compatible with the requirements of a Mental Hospital, in the manner of an ordinary private residence.

The Hospital possesses an Endowment Fund, arising from numerous grants of the late DR. SAMUEL WILSON WARNEFORD and others. When a reduction of the ordinary charge is asked, a special statement of the circumstances of the Patient must accompany the application for Admission.

For further particulars, apply to the Medical Superintendent, ALEX. M. NEILL, M.D.

THE GRANGE, Near Rotherham

CARE & CURE OF MENTAL INVALIDS (Ladies).

A SANATORIUM OF THE HIGHEST CLASS FOR THE

Consulting Physician: CROCHLEY CLAPHAM, M.D., F.R.C.P.E.

Resident Physician: G. E. MOULD, M.R.C.S. Eng., L.R.C.P. Lond.

Physician for Mental Diseases to the Sheffield Royal Hospital.

THE House is a spacious Family Mansion, with extensive pleasure grounds, including good Croquet and Tennis Grounds, and an immense Park, containing Private Drives and Walks of several miles in extent. It is situated in the heart of the famous Robin Hood Country (5 miles from Sheffield, 4 from Rotherham) and is surrounded by beautiful scenery, and an atmosphere free from smoke and impurity. Situation dry and healthy. The arrangements are of a domestic character. The Proprietors welcome visits from the usual Medical Attendant of the Patient during her residence. Under the New Act Voluntary Patients can be received, without Certificates, on own personal application. The Rev. R. T. C. SLADE, Mus. Bac., Vicar of Thorpe-Hesley, acts as Chaplain, and conducts regular Services.

The Resident Physician may be seen at the Grange; or at Leavyngreave House, Mounsfeld Road, Sheffield, by appointment. (Nat. Tel. No. 34, Rotherham.)

GRANGE LANE STATION (M. S. & L. Railway) is within a quarter of a mile of the Grange, and may be reached via Sheffield or Barnsley direct; or via Rotherham changing at Tinsley.

FOR TERMS, FORMS, &c., APPLY TO THE RESIDENT PHYSICIAN.

CLARENCE LODGE,

CLARENCE ROAD, CLAPHAM PARK.

A LIMITED number of LADIES suffering from MENTAL and NERVOUS DISORDERS are received for treatment under a Specialist. The House stands in large grounds.

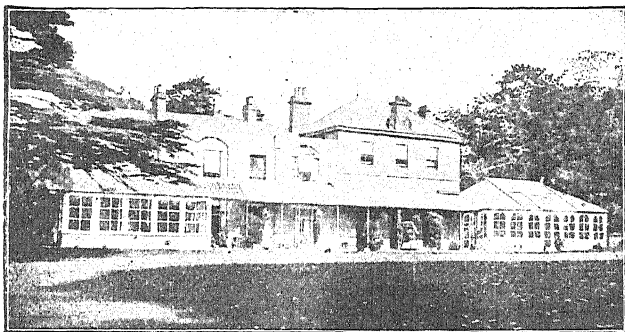
For further Particulars see Illustrated Prospectus from the Proprietress.

Telephone: 494 Brixton.

MRS. THWAITES.

Hendon Grove, Hendon, N.W.

A private Home, licensed by the Board of Control for the reception of 14 ladies suffering from mental and nervous affections. The Home (which stands in its own grounds of 15 acres, 300 ft. above sea level) is easily accessible either by tube to Golder's Green, or by motor-bus from all parts of London, while it is within 5 minutes' walk from Hendon Station on the Midland Railway. Established over 100 years, the



Home has been completely modernised, and all the equipment is up-to-date. The house is furnished as a private residence, and the whole surroundings are made as home-like as possible. It is provided with its own dairy and poultry farm, so that

all cream, milk, butter, eggs, poultry, vegetables, and fruit are of home produce. Tennis, croquet, motoring, carriage drives, and varied in- and out-door amusements. The fees vary from £5 5s. 0d. per week inclusive. A fully illustrated brochure can be obtained on application to the Resident Medical Officer. Phone 764 Finchley.

ST. HELEN'S HOUSE

ST. HELEN'S, HASTINGS.

A PRIVATE HOME

for the reception of a limited number of Cases.

Neurasthenia, Hysteria, and other Nerve Cases received; also Convalescents and those requiring Rest and Medical Care.



The Patients receive individual attention, and treatment is carried out under direct Medical supervision. The Residence is a modern one, with a sunny lawn and garden. It is pleasantly situated at an altitude of 400 ft., in view of the sea, and within easy reach of picturesque coast and country scenery. The climate is healthy, bracing and dry, and will be found most beneficial in cases needing rest and change.

For further particulars apply to **B. A. MOLYNEUX, M.B.**

SPRINGFIELD HOUSE

NEAR BEDFORD.

TELEPHONE No. 17.

AN INSTITUTION FOR THE
CARE AND CURE OF THE INSANE.

TERMS: From 3½ guineas weekly.

Medical Officers { DAVID BOWER, M.D.
CEDRIC W. BOWER, Surg.-Lieut. R.N.

The PLEASAUNCE, YORK.

Telephone: 184 York. Old Established MENTAL HOME for LADIES.



Licensed for 22 Ladies of the Upper & Middle Classes. The House stands in extensive well-wooded Grounds within the boundary of the city.

A special feature is made of the Treatment of Incipient Mental Cases. Certified or Voluntary.

Terms and Prospectus on application to Resident Licensees, Leonard D. H. Baugh, M.B.; (Mrs.) Janie S. Baugh, M.B.

CITY of LONDON MENTAL HOSPITAL

Near DARTFORD, KENT.

Under the management of a Committee of the Corporation of the City of London.

PRIVATE PATIENTS are received at the rate of One Guinea per week and upwards. An Illustrated Booklet giving full particulars can be obtained from the Medical Superintendent. The Institution is within two miles of Dartford Station, on the S.E. Railway, and is about 16 miles from London.

Telephone: DARTFORD 57.

Telegraphic Address: CITY ASYLUM, DARTFORD.

HOLLOWAY SANATORIUM

VIRGINIA WATER.

*A Registered Hospital for the CURE and CARE
of the INSANE and of NERVOUS INVALIDS
— of the MIDDLE and UPPER CLASSES. —*

THIS Institution is situated in a beautiful and healthy locality, within easy reach of London. It is fitted with every comfort. Patients can have Private Rooms and Special Attendants, as well as the use of General Sitting Rooms, at moderate rates of payment. Voluntary Boarders not under Certificates can be admitted.

There is a BRANCH ESTABLISHMENT at CANFORD CLIFFS, BOURNEMOUTH, where Patients and Boarders can be sent for a change and provided with all the comforts of a well-appointed home.

For Terms, apply to the RESIDENT MEDICAL SUPERINTENDENT,
St. Ann's Heath, Virginia Water, SURREY.

DERBY MENTAL HOSPITAL.

**ALBANY HOUSE, a Detached Block for
FEMALE PRIVATE PATIENTS.**

TERMS: $1\frac{1}{2}$ GUINEAS PER WEEK, which include everything except clothing. This Villa is distinct from the main building, and has separate recreation grounds.

For further particulars, apply to the Medical Superintendent,

Dr. S. R. MACPHAIL, Rowditch, DERBY.

WYE HOUSE ASYLUM,

Telegrams—
130 BUXTON. **BUXTON, DERBYSHIRE.** Telephone—
BUXTON 130.

It is situated on an eminence commanding extensive views of the surrounding country. The House is heated throughout by means of hot-water apparatus and open fireplaces. Buxton is situated on the mountain limestone formation, 1,000 feet above sea level. The climate is wonderfully bracing, and its reputation as an inland watering place for invalids is undoubted.

*Terms and Particulars of Wye House can be obtained on application
to the Medical Superintendent - - - W. W. HORTON, M.D.*

ESTABLISHED 1814.

NORTHUMBERLAND HOUSE,

GREEN LANES, FINSBURY PARK, N.

Telephone No.: 888 North. Telegrams: "Subsidiary," London.

An INSTITUTION for the Care and Treatment of Ladies & Gentlemen suffering from NERVOUS and MENTAL AFFECTIONS.

Four miles from Charing Cross; nearest Station, Finsbury Park (G.N. and N. London Railways); Tubes to City and West End. Electric Cars from Finsbury Park Station run every few minutes past the gates.

Six acres of ground, highly situated, facing Finsbury Park.

Private Villas, in suites of rooms.

Voluntary Boarders received without certificates.

SEASIDE BRANCH AT WORTHING.

For Terms and other particulars apply to RESIDENT PHYSICIAN.

CAMBERWELL HOUSE,

33 PECKHAM ROAD, S.E. 5

Telegrams: "PSYCHOLIA, LONDON."

Telephone: New Cross 1057.

For the Treatment of MENTAL DISORDERS.

Completely detached Villas for Mild Cases. Voluntary Boarders received. 20 acres of grounds. Cricket, tennis, croquet, squash racquets, bowls, and all indoor amusements.

An Illustrated Prospectus, giving full particulars and terms, may be obtained on application to the SECRETARY.

Senior Physician: FRANCIS H. EDWARDS, M.D., M.R.C.P.

HOVE VILLA, BRIGHTON—A Convalescent Branch of the above.

THE RETREAT, YORK.

ESTABLISHED 1792.

A Registered Hospital for the Treatment of Mental Diseases.

Under the management of a Committee of Members of the Society of Friends. Situated about two miles from York Station. The Patients are derived from the Upper and Middle Classes, and none are paupers or rate-aided. Terms from £3 13s. 6d. weekly.

Voluntary Boarders are received on their own application.

For further particulars see the Annual Report, which will be sent on application to Dr. BEDFORD PIERCE, the Medical Superintendent. Nat. Telephone: 112 York.

THROXENBY HALL, Near SCARBOROUGH.

A Branch House connected with The Retreat, York, situated near the Raincliffe Woods, about two miles from Scarborough, for the reception of Convalescent Patients, also for the treatment of persons suffering from incipient or mild forms of Mental Disorder who cannot be certified as of unsound mind, and who wish voluntarily to place themselves under skilled treatment.—For further particulars apply to the MATRON, THROXENBY HALL, SCARBOROUGH; or to Dr. BEDFORD PIERCE, at THE RETREAT, YORK. Nat. Telephone: 282 Scarborough.

RETREAT TRAINED NURSES DEPARTMENT.

Staffed by Nurses who have been trained for four years in the Retreat, and conducted upon a profit-sharing basis. MENTAL and NERVOUS CASES only undertaken.

TRAINED FEMALE NURSES, ☐ Apply MATRON, Retreat, YORK.
£3 8s. Weekly. ☐ Nat. Tel. 112.

Incorporated by



Royal Charter.

JAMES MURRAY'S ROYAL ASYLUM, PERTH.

Chairman—The Rt. Hon. The Earl of Mansfield.

THIS MENTAL HOSPITAL, FOR PRIVATE PATIENTS ONLY, is beautifully situated in the immediate vicinity of Perth, in the midst of extensive Pleasure Grounds, which are surrounded by the fields of the Home Farm.

THE INSTITUTION has been entirely re-organized and enlarged by the addition of *two wings*, for the reception of acute cases, so as to render it an efficient *Hospital* as well as a comfortable *Home*.

The Mansion-House of PITCULLEN, which is quite separate from the Asylum, and THE EAST AND WEST VILLAS, afford the necessary variety of accommodation for modern treatment. SEVEN GABLES, ELIE, the seaside house, is arranged for the reception of those suffering from mild mental disturbance, and for convalescents.

Physician Superintendent:

D. MAXWELL ROSS, M.B., Ch.B., Ed.

Telephone No.:
104 Perth.

ASHWOOD HOUSE, KINGSWINFOR, STAFFORDSHIRE.

An old-established and modernized Institution for the Medical Treatment of Ladies and Gentlemen Mentally Afflicted.

THE House, pleasantly situated, stands in picturesque grounds of forty acres in extent, with a surrounding country noted for the beauty of its walks and drives. The climate is genial and bracing. Occupation, indoor and outdoor amusements, and carriage and other exercise amply provided.

TERMS vary according to requirements as to accommodation, special attendance, etc.

TELEPHONE: 19, KINGSWINFOR.

Railway Stations: Stourbridge Junction (G.W.R.), $3\frac{1}{2}$ miles; Dudley (L. & N.W.R.), 4 miles; Wolverhampton (G.W.R. or L. & N.W.R.), 7 miles.

FOR FURTHER PARTICULARS APPLY TO THE MEDICAL SUPERINTENDENT.

NORTHWOODS HOUSE, WINTERBOURNE, near BRISTOL.

A Sanatorium for Ladies and Gentlemen suffering from Nervous and Mental Disorders.

SITUATED in a large Park, 300 feet above sea level, in a healthy and picturesque locality, easily accessible from London, Bristol, and Cardiff by Winterbourne Station; or from Fishponds, Yate, or Patchway Stations.

Voluntary Boarders received without Certificates.

For further information, see London Medical Directory, p. 2049, and for Terms, etc., apply to Dr. J. D. THOMAS, Resident Medical Proprietor, Northwoods House.

Dr. THOMAS attends at 64, PARK STREET, BRISTOL,
on Mondays and Thursdays, from 12 to 1.30 o'clock.

TELEPHONE No. 18 WINTERBOURNE.

BARNWOOD HOUSE, GLOUCESTER.

A REGISTERED HOSPITAL for PRIVATE PATIENTS
Only, of the UPPER and MIDDLE CLASSES.

ARRANGED and furnished with all the most approved appliances for the treatment, comfort, and amusement of the Inmates. Within two miles of the Railway Station, and easily accessible by Rail from London and all parts of the kingdom. It is beautifully situated at the foot of the Cotswold Hills, and stands in its own grounds of 250 acres.

For Terms, etc., apply to **ARTHUR TOWNSEND, M.D.,**
Telephone: No. 7 BARNWOOD. *Resident Superintendent.*

PLYMPTON HOUSE,

PLYMPTON, SOUTH DEVON
ESTABLISHED 1834.

PLYMPTON HOUSE is licensed for the accommodation of both sexes, and is well adapted by its position and appointments for the **Medical Treatment and Care of Patients of the Upper and Middle Classes, suffering from MENTAL DISEASE.**

The proprietors, Dr. ALFRED TURNER and Dr. J. C. NIXON, have had very large experience of Mental cases, both in public and private institutions, and everything that can be done to ameliorate the condition of the chronic, and promote the cure of the acute cases—placed under their charge—is guaranteed.

TERMS ON APPLICATION. *Letters and Telegrams:*
Telephone: No. 2 PLYMPTON. **DR. TURNER, PLYMPTON.**

OTTO HOUSE,

47, North End Road, West KENSINGTON, W.14

Telephone: No. 1004 Hammersmith.

A HOME FOR THE CARE AND TREATMENT OF LADIES
MENTALLY AFFLICTED.

Apply to Miss BRODIE (Resident Lady Superintendent), or to
MRS. SUTHERLAND (Lic. Proprietress), 2a Marloes Road, KENSINGTON, W.8

"NORMANSFIELD."

A PRIVATE ESTABLISHMENT for the care and training of the
MENTALLY DEFICIENT.

Patients of either sex, including quite young children, received.
Separate houses for the slighter grades of defect.

For particulars apply to the Resident Physician and Proprietor, HAMPTON WICK.

FARNHAM HOUSE (Gentlemen), MARYVILLE (Ladies), FINGLAS, DUBLIN.

Telegrams: "BENSON, FINGLAS."

Telephone No. 1479.

Private Hospitals for Ladies & Gentlemen of the Upper Classes suffering from Mental & Nervous Diseases, Alcoholism, Drug Habits, Epilepsy, &c.

These establishments, healthily situated within three miles of Dublin, Grounds of some 50 acres, provide modern medical, curative and palliative treatment.

VOLUNTARY BOARDERS admitted without certificates.

A WINE has been opened for the treatment of Alcoholism, Drug Habits, etc., with its own recreation grounds, and these patients are quite apart from those suffering from mental and nervous diseases. TERMS FROM **3 guineas** PER WEEK.

Prospectus on application to the Resident Medical Superintendent, **H. P. D'ARCY BENSON, M.D., M.R.C.P., F.R.C.S.Eng., Farnham House, Finglas, Dublin.**

ESTABLISHED 1824.

The Retreat Private Asylum, NEAR ARMAGH.

For the CURE and TREATMENT of Ladies and Gentlemen of the Upper and Middle Classes suffering from

MENTAL AND NERVOUS DISEASES.

Voluntary Boarders and Inebriates admitted without Medical Certificates.

This Retreat is beautifully situated in picturesque grounds and farm of nearly 150 acres, and Patients enjoy the greatest possible liberty. There is a large percentage of Recoveries on recent admissions.

For particulars apply to Resident Medical Superintendent,
Dr. J. GOWER ALLEN, J.P.

ADREMONT NURSING HOME, HIGH WYCOMBE, BUCKS.

28 miles from London, receives **MEDICAL, SURGICAL, MIDWIFERY,** and slight **NERVE PATIENTS.** Beautifully situated, and especially adapted for Patients requiring highly qualified attention and home life, and the surroundings of a well-appointed Country Home.

— MODERATE FEES. —

Telephone 87.

Apply **MATRON.**

West Malling Place, KENT.

PRIVATE RESIDENCE for the Care and Treatment of Ladies or Gentlemen **SUFFERING FROM NERVOUS or MENTAL AFFECTIONS.** Situated in the beautiful Fruit and Hop districts of Mid-Kent. Easy distance by rail from London, and the Coast.

TERMS ON APPLICATION TO RESIDENT PHYSICIAN.

TELEGRAMS: "DR. ADAM, WEST MALLING."

TELEPHONE: MALLING 2.

PRIVATE ASYLUMS. CO. DUBLIN.

HAMPSTEAD, Glasnevin, for Gentlemen | HIGHFIELD, Drumcondra, for Ladies.

For the Cure and Care of Patients of the Upper Class suffering from
Mental and Nervous Diseases and the Abuse of Drugs.

Telephone No. 1032.

Telegrams: "Eustace," Glasnevin.

These Hospitals are built on the Villa System, and there are also Cottages on the demesne (154 acres), which is 150 ft. above the sea level and commands an extensive view of the Dublin Mountains and Bay.

Voluntary Patients admitted without Medical Certificates.

For further information apply for illustrated prospectus, etc., to the Resident Medical Superintendents: DR. HENRY MARCUS EUSTACE, Highfield, Drumcondra, or DR. WILLIAM NIELSEN EUSTACE, Hampstead, Glasnevin; or at the Office, 41, Grafton Street, Dublin. Telephone 193. On Mondays, Wednesdays and Fridays, at 2.30 p.m.

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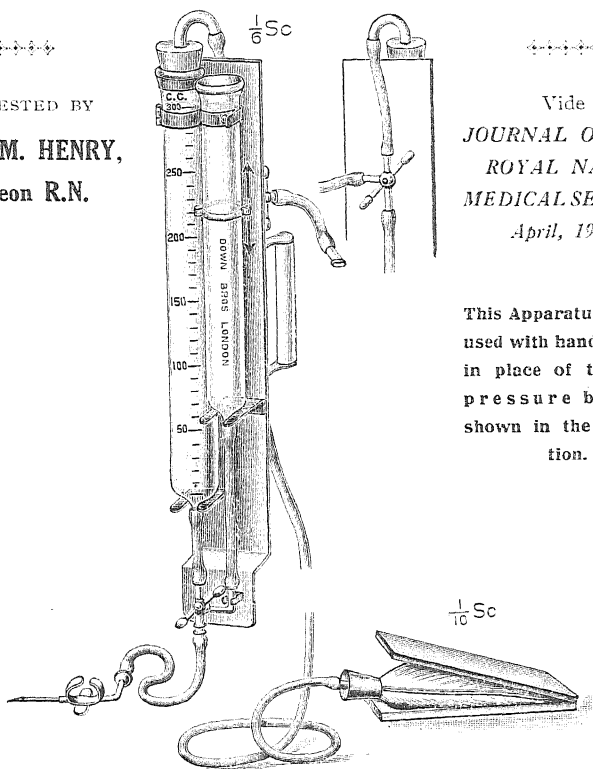
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Vide

*JOURNAL OF THE
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This Apparatus can be used with hand bellows in place of the foot-pressure bellows shown in the illustration.



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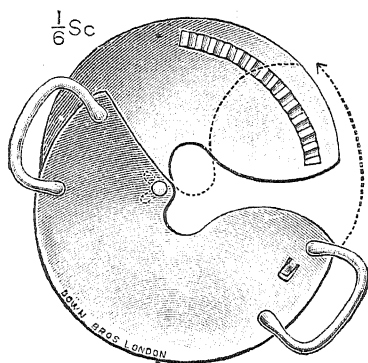
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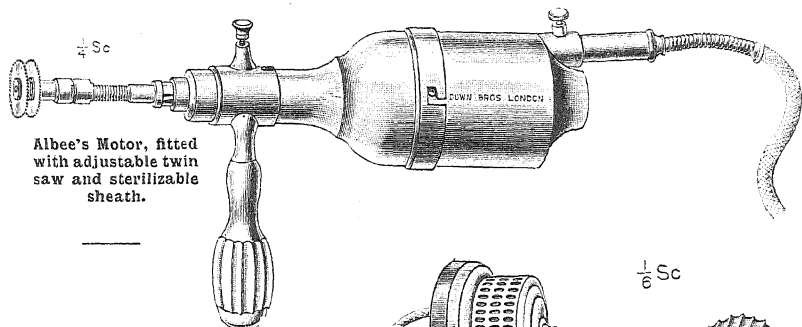
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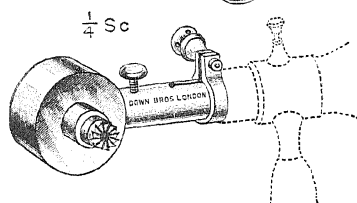
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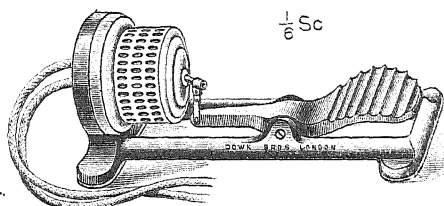
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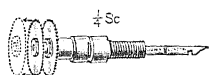


Albee's Apparatus for cutting bone dowels.

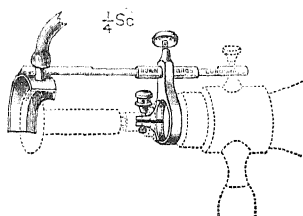


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Complete List of Dr. Fred. M. Albee's Instruments on application.



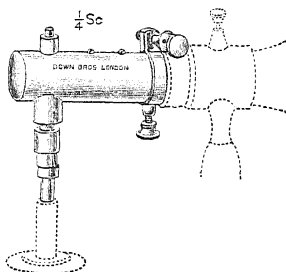
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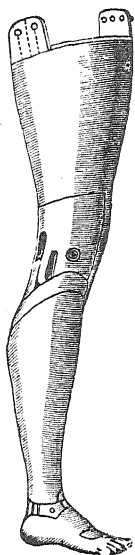
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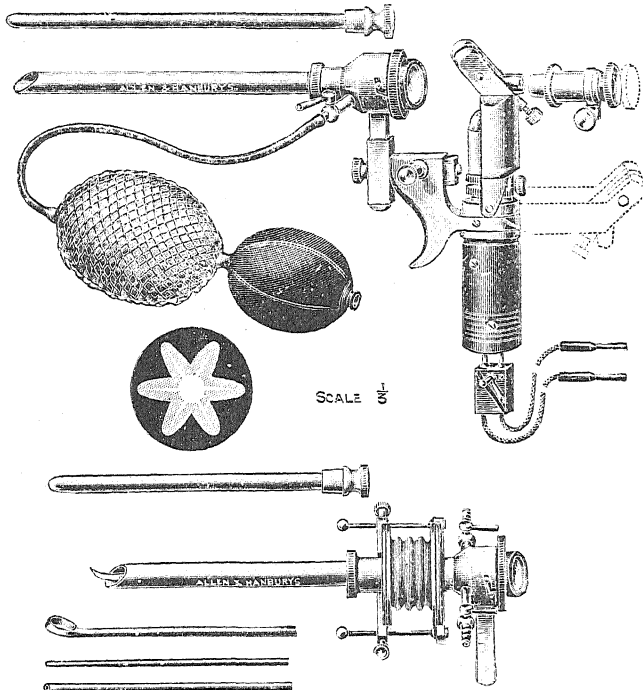
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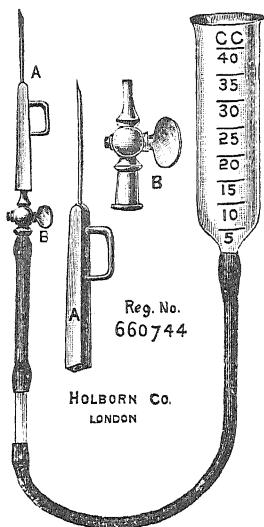
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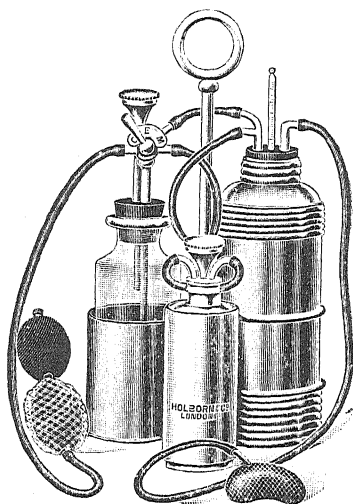
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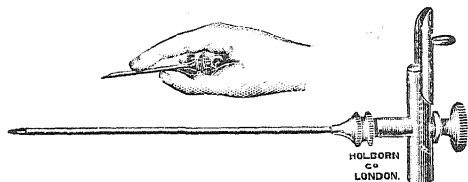
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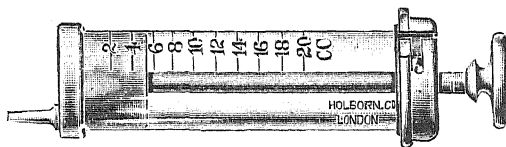
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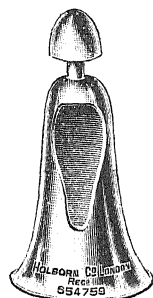


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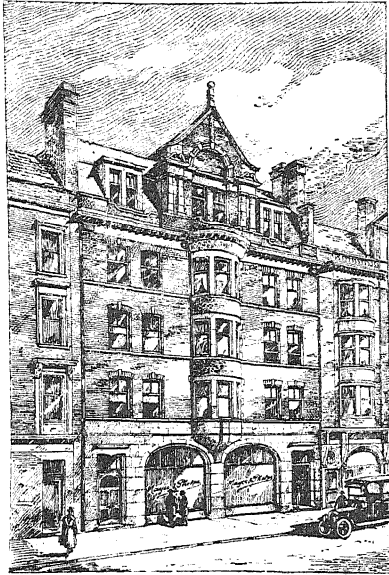
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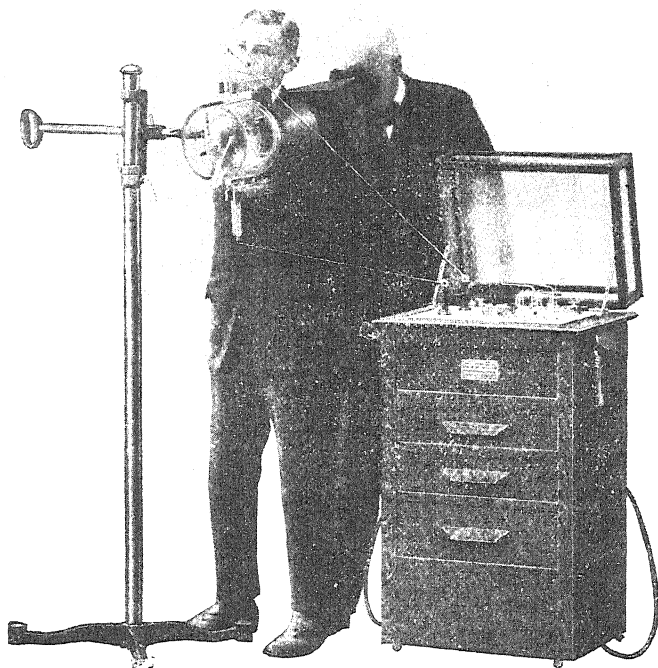
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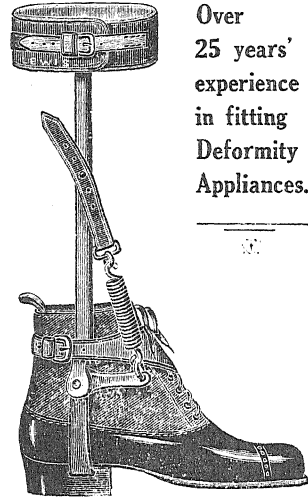
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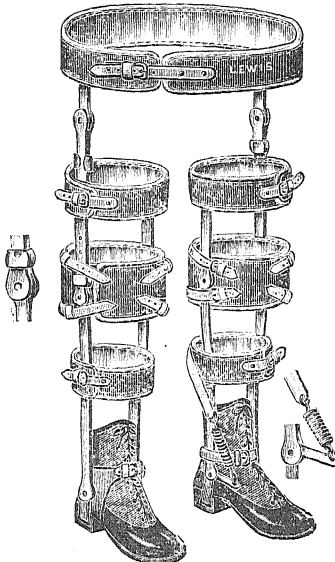
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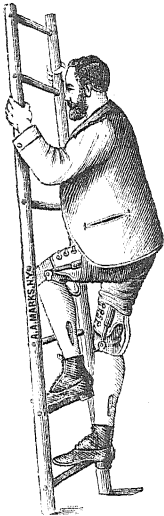
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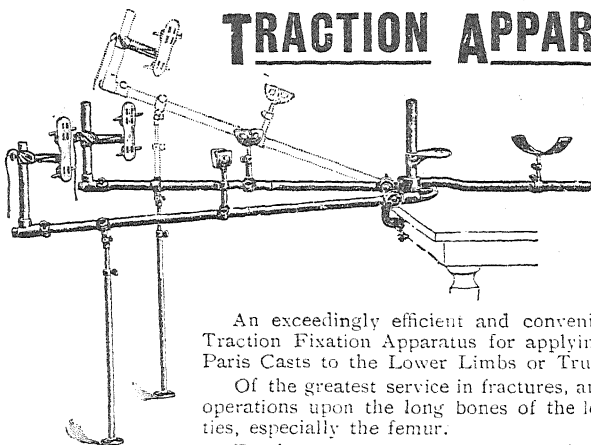
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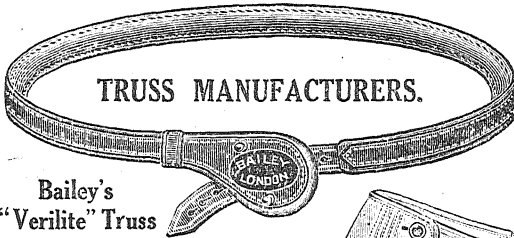
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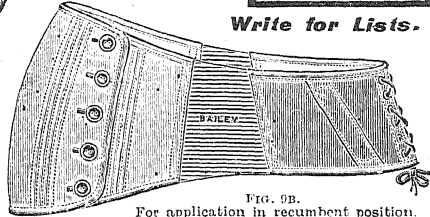


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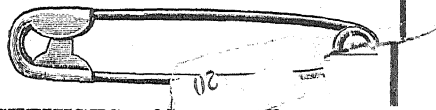
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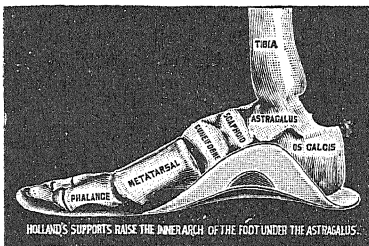
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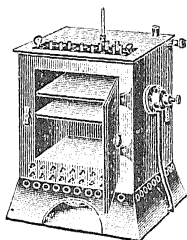
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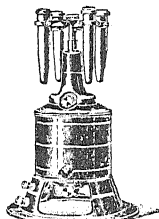
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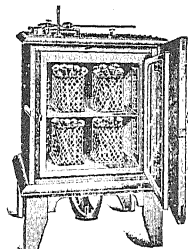
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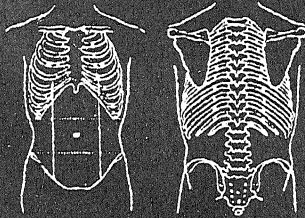
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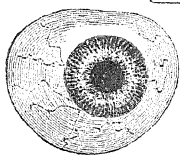
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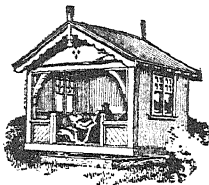
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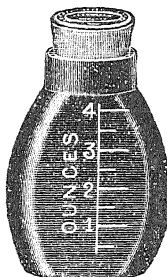
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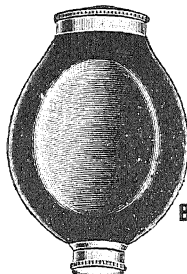
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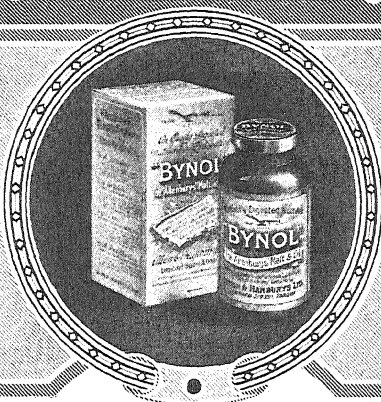
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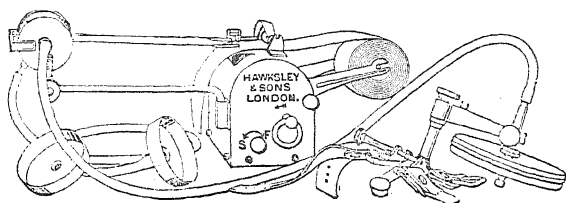
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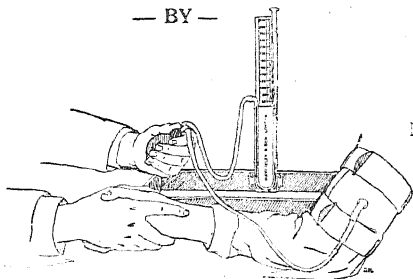


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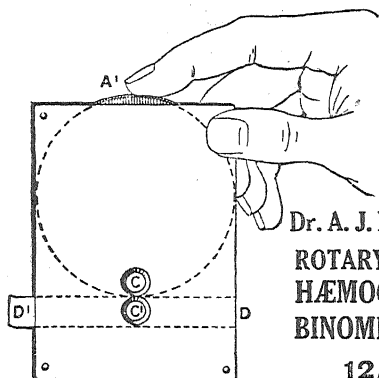
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We desire to direct attention to the following letter received recently from a member of the Medical Profession, speaking of the benefit derived from the administration of NEPENTHE in his own case.

Dear Sirs,

This letter (written with the left hand) is intended to convey my intense gratitude for the NEPENTHE received on Tuesday.

On December 20th I had a cycle accident, resulting in severe concussion, and a compound comminuted T-shaped fracture of the lower end of right humerus, communicating with the joint.

I suffered a great deal from pain and shock.

Morphia, though clearly indicated, was given with dire results—foul tongue, headache, and, worst of all, intense skin irritation; the after-effects of the morphia were so marked, that it had to be stopped. Various hypnotics had been tried and proved useless, and in desperation a dose of Morphia was given on Monday night; result—intense urticaria, swollen lips, hands and joints.

On Tuesday I got the NEPENTHE; the effects were immediate and astounding—quiet, restful sleep; after-effects—no headache, clean tongue, bowels acting, and for the first time since my accident I had a desire for food at lunch and dinner yesterday.

The comfort I have received has been so great that I wish you to bring the case to the notice of the Profession in a strictly legitimate way.

Yours faithfully,

—, M.B., C.M., (Aberdeen).

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Nepenthe (ordinary), in 2 oz., 4 oz., 8 oz., and 16 oz. Bottles.

Glycerole of Nepenthe, for Hypodermic injection (8 times the single strength), in 1 oz. Bottles.

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